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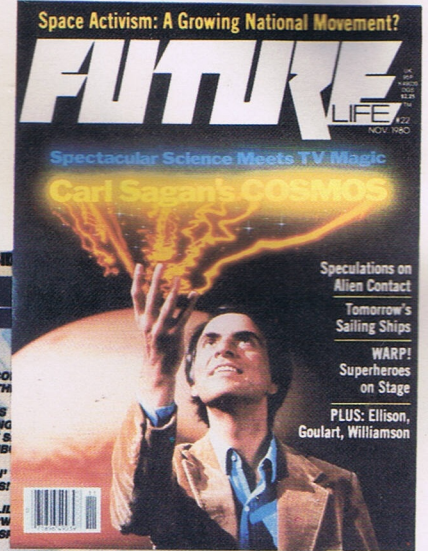
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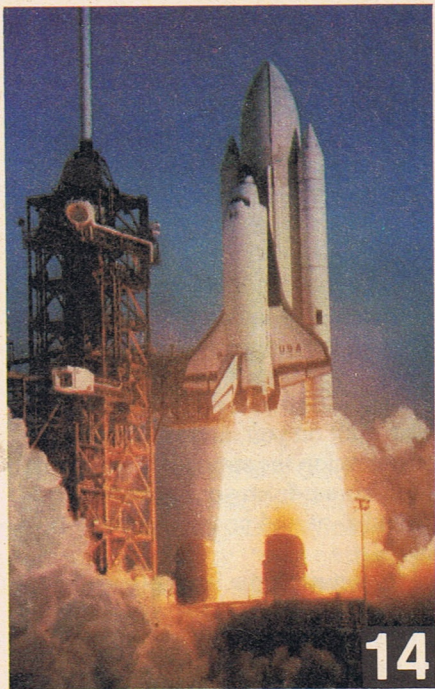
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FUTURE LIFE

#28 August 1981



14

DEPARTMENTS

4 **OUTPUT**/Kerry O'Quinn. A message from the Publisher.

6 **INPUT**/Jog-ins and spin-offs. Letters from our readers.

9 **DATABANK**/Spacey comets, spacer cooks.

36 **ALTERNATE SPACE**/Carolyn Henson. Barbecuing in orbit.

37 **GALLERY**/Blasting off with shuttle photographer Ctein.

40 **AN EDGE IN MY VOICE**/Harlan Ellison. Moral Majority II.

43 **IN PRINT**/Bob Mecoy. Book news and reviews.

48 **SOUNDSCAPES**/Lou Stathis. Classical maverick Otto Luening.

52 **TOMORROW**/Robert A. Heinlein. Over the rainbow.

58 **PORTFOLIO**/Ron Miller. David Egge's excelsiorealism.

FEATURES

14 **THE SHUTTLE ERA BEGINS**/Bob Woods. A special on-the-scene report on the liftoff of the space shuttle *Columbia*.

20 **THE COLUMBIA: HOW IT WORKS**/Jesco von Puttkamer. A NASA space scientist examines the shuttle program as a whole.

23 **SPACE SHUTTLE: THE MOVIE**/Alan Brender. How film special effects artists have gone where no camera has gone before.

24 **EMORTALISM**/Peter H. Christiansen. They're trying to cure death in our lifetime—will they succeed?

28 **SUPERMAN II**/Ed Naha. After leaping legal obstructions and behind-the-scenes fighting in a single bound, look! up in the sky . . .

33 **INTERVIEW: ROBERT L. FORWARD**/Barbara Krasnoff. The author of *Dragon's Egg* explains his scientific view of things.

45 **SUMMERTREK II**/Barbara Krasnoff. Once more, we present our readers with a list of what's happening in science this summer.

64 **FUTURE CLASSES**/Robert Greenberger. Around the nation, students are learning how to predict their possible tomorrows.

70 **COMPUTER GRAPHICS**/Dave Beauvais and Jim Hoffman. Digital magic fosters a new art form—painting by computer.



58

Business and Editorial Offices:

FUTURE LIFE Magazine
475 Park Avenue South
New York, N.Y. 10016

Publishers

NORMAN JACOBS
KERRY O'QUINN

Associate Publisher

RITA EISENSTEIN

Editor

BOB WOODS

Art Director

CHEH NAM LOW

Managing Editor

BARBARA KRASNOFF

Asst. Art Director

BOB SEFCIK

Art Assistants

LAURA O'BRIEN
AMY BERGENFELD

Columnists

HARLAN ELLISON
CAROLYN HENSON
BOB MECOY
LOU STATHIS

Contributing Editor

DAVID HUTCHISON

Space Art Advisor

RON MILLER

Staff Photographer

JOHN CLAYTON

Production Assistant

DAVID HIRSCH

Guest Columnist

ROBERT A. HEINLEIN

Contributors This Issue: Dave Beauvais, Alan Brender, Hank Caruso, Peter H. Christiansen, Ctein, Steve Dodd, Don Dougherty, David Egge, Robert L. Forward, Terry A. Garey, Robert Greenberger, James T. Hoffman, Jane MacKenzie, Ed Naha, Jesco von Puttkamer, Cathy Stone, Walter Velez, Christina Westcott.

For Advertising Information: Rita Eisenstein: (212) 689-2830.

ON THE COVER: On April 12, 1981, at 7:00:39 a.m. EST, the space shuttle Columbia left the Earth and embarked on its first voyage. For a first-hand account of the lift-off, complete with full color photos, see our special shuttle section beginning on page 14.

The FUTURE LIFE Philosophy Part III: "Individual Liberty"

Everyone's goal in life ought to be the achievement of happiness. Happiness is nature's reward for doing the right things and nature's encouragement to keep up the good work.

Nature's only hard requirement is that whatever you do must be rational and positive. Beyond that, each person is invited to follow his own unique path to happiness—whatever gives you the greatest sense of pride and accomplishment.

There are as many roads to happiness as there are human beings on Earth, and the ingredients needed to create happiness go far beyond basic career goals and into every subtle aspect of each person's life.

Nobody can tell you what your requirements for happiness are; that is very personal knowledge that you must discover for yourself. There is only one *universal* requirement—freedom from force!

Your father should not force you into his business; your neighbors should not shame you into doing what they expect of you; your government should not legislate you into actions they tell you are "for your own good." It's your life, and all the choices ought to be yours, along with the responsibilities.

Your family and friends may nag and heap guilt on you, and your neighbors may bring social pressures to bear. You must develop the strength to withstand those obstacles, but the only unfightable force comes from your government. It's unfightable because they use handcuffs and guns and prisons—all justified by the fact that they are enforcing The Law.

The basic purpose of The Law *should be* to prevent force from others, but over the centuries, in every country on this planet, The Law has been corrupted. The United States was formed as a society in which, for the first time in history, the government existed solely to *protect* the rights of citizens and thereby to encourage the pursuit of happiness by each person in his own individual way—just as nature intended.

But even in this country, that purpose has become corrupted. Nowadays, we have laws that tell us how we must handle domestic relationships, how we must have sex, how to be charitable, run our businesses, entertain ourselves, eat, drink—in fact, there is almost no aspect of our personal lives that is untouched to some degree by government force.

Being free is like being pregnant—*either you are or you aren't*. The half-and-half deals that governments try to sell people are merely attempts to get us to surrender our natural rights without a struggle.

The future is dependent upon individual liberty. Every new idea—every scientific theory and invention—comes from single minds—minds that can be turned on or off by the owners. It's not easy to think, and the more innovative the thinking the more effort is required and the more incentives are needed. Each owner must have strong personal reasons to turn on his mind and make it work.

When laws take away liberties—personal choices and rewards—the government is siphoning off the basic fuel that moves the human race onward and upward. They are putting a lid on what we can achieve.

For the sake of personal happiness and for the progress of humanity, individual liberty is an imperative for the future.

Kerry O'Quinn/Publisher

Next Issue: "Scientific Progress"

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POLITICAL PEEVES

... "Reaching for the Stars" (FUTURE LIFE #25) was *beautiful*! You're right! But what can we do—really—to bring all this about? I, for one, feel very helpless in the face of Alexander Haig, or Phyllis Schlafly, or the "Moral Majority." Creeping fascism!

I just finished listening to President Reagan's speech. Cutting arts and humanities, cutting social services, cutting the space program! And for what—so we can have a shiny new pile of world-destroying weapons. I'm reminded of the words of Edith Keeler in the *Star Trek* episode "City on the Edge of Forever"—"Someday maybe they'll take all the money they spend on war and death—and spend it on life." When is that going to happen?

I agree with your editorial (and, to an extent, with Reagan) that we have too many regulations on us from government, but Reagan's shift of *some* power to the state and local levels will result, in my opinion, in a kind of "feudalization" or fragmenting of our society. However, Reagan and his people, while promising to "get government off our backs," nevertheless are eager to put direct government interference in our private lives—that is, upholding the silly old sex laws and at the same time interfering with reproductive freedom.

Karla Taylor
Bloomer, WI

EVOLUTIONARY GAPS

... G. Davis of Portland, Oregon, may consider the theory of evolution absurd (Input, FUTURE LIFE #26), but is it any more absurd than the idea that God created the heavens and Earth in seven days somewhere around the year 4,000 B.C.? Yet, the impracticality of that idea in no way rules out the remote possibility that it may have indeed been the case. What the creationists seem unable to grasp is that nothing about the theory of evolution suggests God may not have set the whole process into motion to begin with.

Unfortunately, the intellectual capacity G. Davis demonstrates in his/her feeble attempt at wit (describing Timothy Leary as "the anal sphincter of a north-going mule") only suggests that the evolutionary gap between man and ape may not be as great as we'd like to think.

Michael Dale Brown
Inglewood, CA

ANTI-ABM

... Though I have great personal respect for Carolyn Henson, I am appalled by the naivete she demonstrates in advocating the use of laser-armed ABM satellites. (FUTURE LIFE #26)

Sure, the deployment of such a system would boost space development in general. Yes, it could prevent the nuclear destruction of civilization, if—and *only* if—the members of the nuclear club had equivalent systems which became operational instantaneously.

At the moment either the U.S. or the U.S.S.R. completes its ABM network, it will be invulnerable to ballistic missile attack (though of course it would still be unprotected from bombers and cruise missiles). It would have an opportunity to rid itself, finally, of its adversary—with minimal cost to itself. Or, the nation that is behind in ABM deployment might launch a preemptive strike—while it still had the chance. Either way, ABMs mean a whole new arms race—one with a finish line all-too-plainly in sight.

Lauri Donahue
Boston, MA

HENSON REPLIES

... According to George Fergus (FUTURE LIFE #26), a lunar jogger would experience the same force on the joints as one would on Earth. This assumes that our friend on the Moon puts as much upward force in his/her stride as us poor Earthworms struggling along under one gee.

Well, when I make it to the Moon I'm going to be a lazy jogger. I'm already as lazy about it as I can get down here. Runners are trained to put as little effort into the up and down, and as much effort into the forward as they can. You can spot me jogging a half mile off because not only do I not bounce up and down hardly at all, I don't even put all that much effort into moving forward. Up on the Moon I will definitely *not*, as Fergus proposes, rise six times higher with each stride. I may not even move six times farther with each stride, but if I did the force on my joints as I land on each foot will still be reduced because I'll be experiencing a reduced downward component of force.

Up on the Moon, just like down here, I'll probably be passed by all those gorgeous physical specimens who wouldn't dream of getting back trouble. But that's okay. My object is not, as George Fergus assumes, to put as much effort into jogging as I'm forced to Earthside. It's to whiz along, having fun and feeling good. I'll whiz a lot faster on Luna!

Regarding roller skating, Mr. Fergus tells us it's easier to push an empty roller skate than a full one because the force of gravity increases the friction on the skate. While this is partially true, aficionados of skateboarding and roller skating are aware that today's

manufacturers have reduced frictional losses to the negligible level. The primary limitation on the speed of roller skating now is coupling your muscular strength into the wheels. (In my case, I'm sorry to admit, the main limitation is trying to keep from falling down.)

Why is it so much easier to push an empty roller skate? It's the force required to overcome inertia. Inertia works the opposite way if you put one empty roller skate and one with a 50-pound lead weight at the top of a hill. The lead weight is going to win the race. It doesn't prove that friction is decreased by gravity any more than the ease with which Mr. Fergus can push an empty roller skate proves that lunar skaters will be able to go significantly faster.

Carolyn Henson
Tucson, AZ

SPINNING OFF

... In reference to the letter from George Fergus of Motorola, Inc. (FUTURE LIFE #26) Mr. Fergus seems to "throw the baby out with the bath." His reference to "alleged" spinoffs from the space program is ludicrous. NASA publishes a bulletin every month listing the various spinoffs that are coming out of the space program. Most of these emerge from the *manned* space projects.

The operative word here is *applications*. Sure, solid-state electronics were around before NASA, but it *is* true that the microelectronics (I emphasize the word *micro*) used in missiles and spaceflight were specifically developed for this purpose. The circuits he refers to were simply too big. That integrated circuits are more reliable is merely a fortunate happenstance.

The application of microelectronics for the monitoring of the physiological and mechanical functions of the pilots and spacecraft, which are now used to save countless lives in ambulances and intensive care units all over the world, are excellent examples of "alleged" spinoffs from the space program; which, in my opinion, justify the cost. What price human life? And let us not forget all the new diagnostic medical techniques that have come from manned spaceflight, such as CAT scanners, block and serum analyzers, etc.

While it is true that Teflon was around long before NASA, many of the fire-retardant plastics in common use today (you probably sleep on the stuff) came from the manned space program.

One last point: While Mr. Fergus took a swipe at the visionaries of 25 and 50 years ago, he failed to point out the things they were right about. Things such as space flight, instant worldwide communications, fast worldwide air transport, computers, lasers, advances in medicine, etc. And while I don't have a helicopter in my backyard, here in Houston you can't step outside without seeing several helicopters pass overhead.

If you are interested in receiving the NASA bulletin I referred to earlier, write to: National Aeronautics and Space Administration, Public Affairs Office, Lyndon B. Johnson Space Center, Houston, TX 77058.
Kenneth P. Myers
Houston, TX

CREDIT WHERE IT'S DUE



PHOTO © 1981 UNIVERSAL FILMS

... In Barbara Krasnoff's fine article "From Housewife to Heroine" (FUTURE LIFE #26) she noted the transformation of *Buck Rogers'* Wilma Deering from movie doll clone into TV's self-assured, take-charge pilot. Whenever women are shown on television in a positive light, it is due to someone's hard-fought efforts, and credit belongs here to Anne Collins, the show's first story consultant.

She refused to subordinate Wilma to the role of distressed damsel and, with producer Bruce Lansbury's blessing and story editor Alan Brennert's aid, she created a thinking, independent Wilma who as often as not came to Buck's rescue from time to time, always over objections from the series' male lead.

Regrettably, progress isn't permanent. Both Collins and Brennert quit the show halfway through last year citing "interference" and the current season's new producer and editors have allowed Wilma to slip, relegating her to mini-skirt and dial-twirling with an incidence of sexual peril now and then.

Ah, Wilma, we knew you when. . .

Bill Taylor
Los Angeles, CA

MS-ING THE POINT

... I don't understand Ms. Krasnoff. Would she be happy if only ugly women were cast in SF films and television? A beautiful woman is a credit to her sex.

Donald A. Webster
Hapeville, GA

TERRA-IZED

... You've used the term "Earthling" in several articles over the last few months. "Earthling" always reminds me of a blind, naked, helpless worm. How about replacing it with "Terran"?

I think you'll agree that "Terran" sounds, and looks, much more dignified. (I wrote a letter to *Newsweek* several months ago, asking them the same thing. They say they can't do it, until the word appears in the *Third International Webster's*, which they use as their Supreme Court. It'll never get there if the SF community doesn't start plugging it into the book. I recommend that we get started.)

Also, you use "he or she"—which you know is still sexist, and would still be, even if you say "she or he." How about dropping that, and using "s/he" and "h/er"? These are somewhat less cumbersome, and not immediately sexist.

Richard Musgrave
Chicago, IL

SURVIVALISTS

... Coverage of a group that seriously concerns itself with the destruction of the human race does not deserve space in a magazine devoted to man's progress! ("Survivalists," FUTURE LIFE #27) In fact, they don't deserve coverage in any magazine. But by playing on

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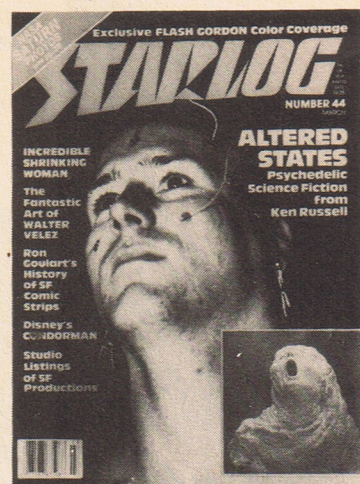
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nihilation of civilization it will be people such as the Survivalists. It's called self-fulfilling prophecy.

Janet Wilson
Troy, MI

CORRECTION

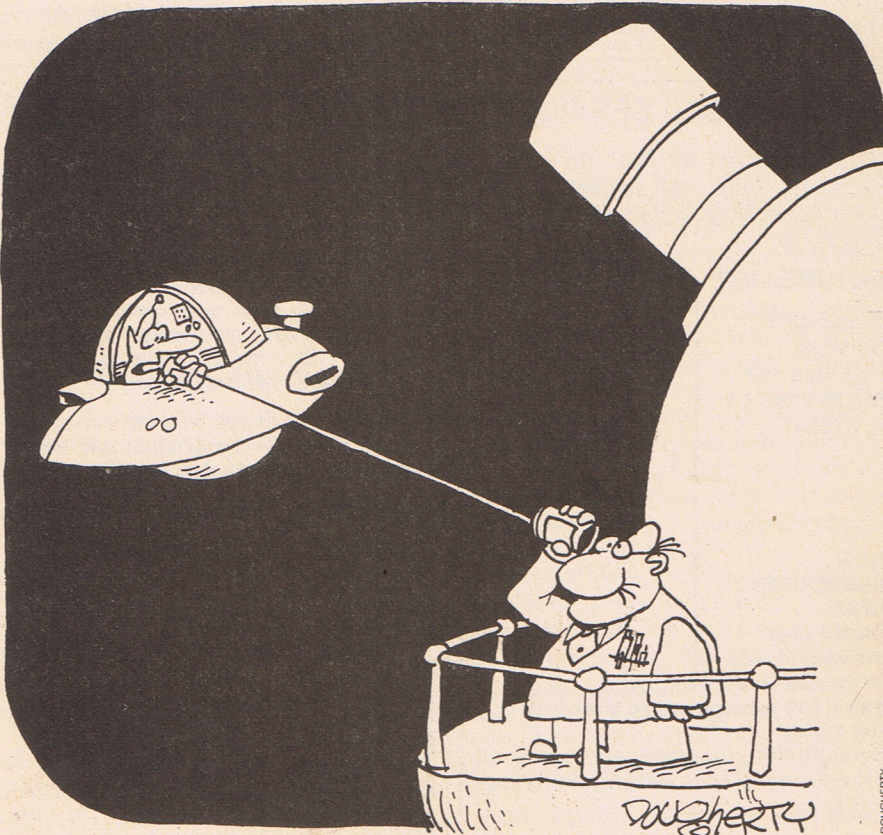
... This is it! In my opinion issue #26 was your best issue yet. The cover was beautiful, the articles were well written and very informative.

Unfortunately, there was one little minor mistake. In the article on ion propulsion you state that Dr. Harold Kaufman worked on ion propulsion in 1959, one year before the first manned space flight. This was wrong. The first manned space flight was in 1961, not 1960 as was said. This flight was done by Yuri Gagarin of Russia on April 12, 1961. The flight lasted one hour and 48 minutes.

Kevin Hall
Castlewood, VA

Editor's Note: April 12, 1981 will now stand as another prominent day in space exploration; the launching of the first space shuttle, Columbia.

the innate fears we all have they have gained considerable recognition and support. If there is anything that will facilitate the an-



"I said, 'In some ways we are very advanced and in some ways we aren't!'"

ART © 1981 DON DOUGHERTY

NERVA

... I found your article on ion-powered space ships outstanding (FUTURE LIFE #26). There is, though, another alternative to the liquid fueled engine. It is the NERVA. The NERVA is the atomic-powered engine developed by Westinghouse.

Unlike the ion-powered engine, the NERVA needs no sunlight or enormous solar panels to operate. The large solar panels could be a problem when meteors are around. Don't get me wrong, I'm not against the ion-powered engine, it's just that the panels will make the ship awkward in deep space. Besides, the ship requires nuclear batteries to reach Jupiter, as you brought out in the article.

The best use for the ion engine would be in close solar operation, where sunlight is cheap and meteors are few. The NERVA would be the engine for the outer solar system and beyond.

Mike Cioletti
Pittsburgh, PA

"KAIN" UPDATE

... Just a couple of notes and corrections for your Roger Corman article (FUTURE LIFE #26). *Kain of Dark Planet* is a project that has been pulled/recalled from New World Pictures. It was written by John Broderick and William Stout, and was to be directed by Broderick. The color art that you printed (on page 24) is not owned by New World; I hold the copyright.

William Stout
Hollywood, CA

FEELING GOOD

... I am a fairly new subscriber to FUTURE LIFE (last summer). I became a subscriber the day I learned Harlan Ellison was to have a permanent spot in the magazine. I had not yet even seen a copy of it, having ripped the coupon for FL out of another magazine (Asimov's, I think). I didn't feel like I was taking a chance because, at the very least, I would have a steady supply of Ellison delivered to my doorstep. It also seemed to me that any magazine he was writing a column for (and that gave him carte blanche) was almost certain to be one that I would enjoy. Neither of you have disappointed me. Thanks!

All this is in the way of assuring you that you did a good thing. I said a little "uh-oh" when I read Ellison's column in issue #26 when he inferred that you were still a little nervous about the whole thing. Harlan Ellison makes me feel good, not bad (make that great).

I guess what I'm trying to say is don't worry, Harlan Ellison enhances FL. Lots of us like you both.

Judy Stevens
Garden Grove, CA



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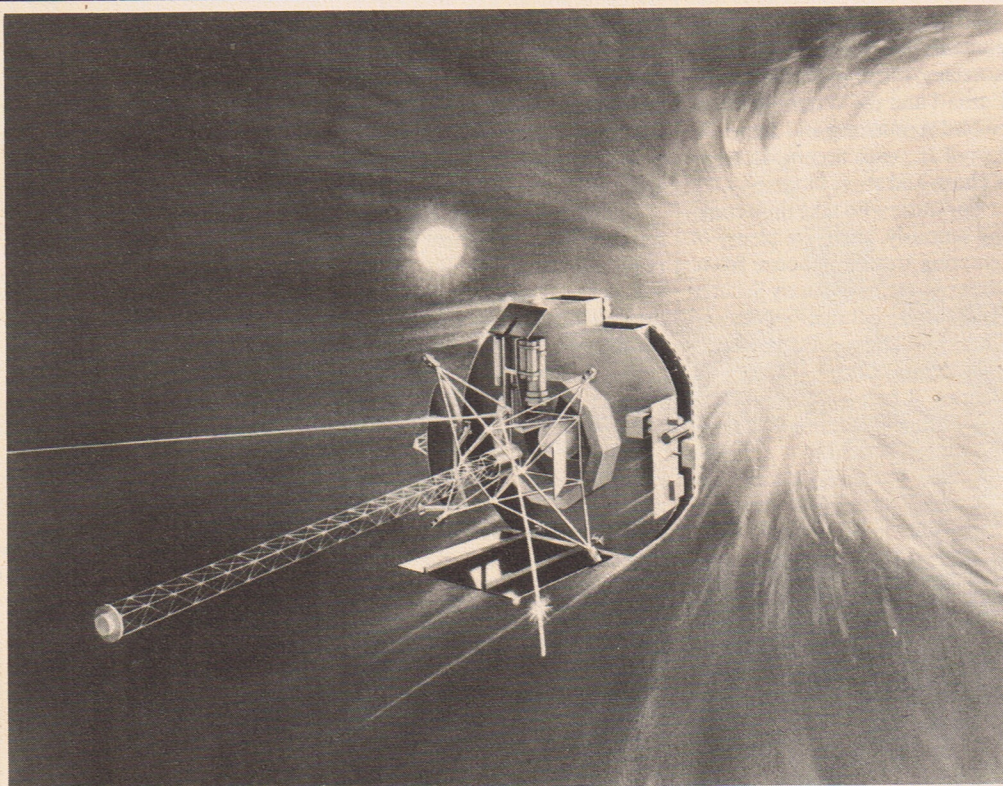
CELESTIAL RENDEZVOUS

COMET TALES

Future-oriented lobbyists of every sort were among the multitudes on hand for the spectacular launch of the space shuttle *Columbia* last month. One of the more visible groups (complete with official buttons and T-shirts) was The Halley Fund, organizers of a last-ditch effort to involve the United States in a rendezvous with Halley's Comet, which makes its every-76-year visit to our solar system in 1985/86.

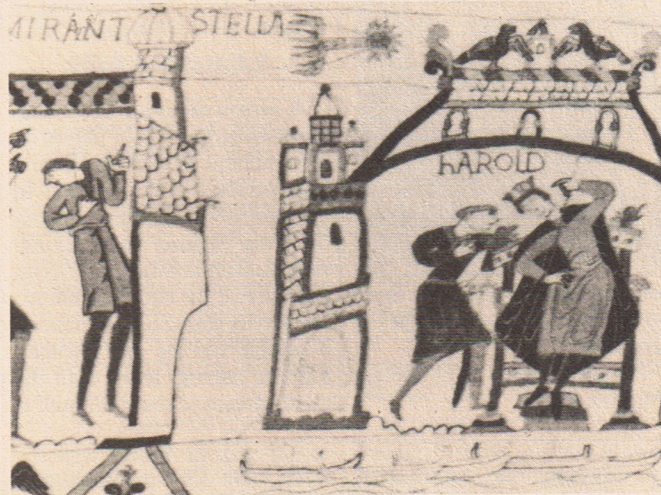
Founders of The Halley Fund held a press conference near the Kennedy Space Center to announce their efforts to invoke private citizens' cooperation in this monumental project, dubbed HIM, or Halley's Intercept Mission. Van R. Kane, director of the Fund, stated that their purposes are three-fold: to demonstrate widespread public support for a U.S. Halley's mission; to encourage direct citizen participation in the historic exploration of the celestial body that has fascinated humans for hundreds of years; and to directly pay for some portion of U.S. efforts to explore the comet.

NASA had planned to send a craft to meet the comet—which won't streak our way again until 2026—but continued budget slashings over the past decade led to an abandonment of two such proposed missions. Russian, Japanese and European encounter missions are scheduled, though the Fund claims that only the United States has the navigational and optical technology to ensure maximum inspection of the comet. Dr. Joseph Veverka, chairman of NASA's Comet Science Working Group and a member of the Fund's advisory council, wrote in the May issue of *Star and Sky* magazine, "Perhaps the most fundamental reason for sending a spacecraft to a comet is



ART. JPL/NASA

This drawing shows the proposed Halley Intercept Mission as it flies by the comet in 1986.



The Bayeux Tapestry shows the comet's appearance in 1066 A.D.

that there are some 100 billion of them in our solar system, and so far we haven't explored a single one."

The Halley fund is actually a

project of Delta Vee, Inc., the same non-profit citizen's space explorations organization that formed the similar Viking Fund to solicit funds needed to further

operations of the Viking lander on Mars. Last January, The Viking Fund presented NASA officials with a \$60,000 check, and an additional \$40,000 has been gathered since. The Halley Fund hopes to match this figure by early summer of this year.

The money will be turned over to NASA or directly to U.S. scientists planning to study Halley's Comet. Delta Vee also hopes that their labors will help influence Congressional hearings this summer on whether to grant the space agency funds for an encounter mission. If the NASA proposal is not approved, the money will be used to pay the expenses of American scientists associated with the European project.

Tax deductible contributions can be sent to The Halley Fund, 357 Saratoga Ave., Santa Clara, CA 95050. —Bob Woods.

HEAVENLY COOKING

FLYING PANS

Yes, ladies and gentlemen, here it is! What all you imaginary air aces and aspiring astronauts have been waiting for—the *Famous Personalities of Flight Cookbook*. Published by the Smithsonian Institution's National Air and Space Museum, the 132-page paperback volume contains the recipes of high-flying notables ranging from Amelia Earhart and the Wright Brothers to Neil Armstrong and James A. Lovell Jr., each accompanied by a photo and short biography.

For those who take their cooking seriously, there are plenty of tempting treats to choose from. For example, you can try Senator Harrison J. Schmidt's "Special Chili," or Thomas P. Stafford's "Chocolate Cheese Cake," or Charles Lindbergh's mother's "Swedish Party Cakes." Or try Jacqueline Cochran's "Pecan Pie" and Jerrie Mock's chicken "Bastilia." You never heard of these latter ladies? Well, then,



perhaps you should take a look at this book for its historical content as well—in her search for recipes, author Mary Henderson has uncovered more female pilots than most textbooks will admit to. (Just for the record, Jacqueline Cochran was the first woman to fly faster than the speed of sound; and Jerrie Mock was the first woman to pilot an aircraft around the world, and set a speed record on a flight from Columbus to Las Vegas in 1965.)

However, since there are quite a few non-cooks among America's aviators, the gaps have been filled in by recipes of a different nature. Those with a sweet tooth,

ENERGY

WIND FARMS

The largest windmills in the world will begin to produce power for consumption this summer.

Located at Goodnoe Hills, near Goldendale, Washington, the trio of windmills are the first to be grouped into a so-called "wind-farm." The mammoth structures, which measure 300 feet tip to tip, are currently being assembled and tested by the Boeing Engineering and Construction Company at a cost of \$30 million.

Called MOD-2, the windmills are the first government project requiring the windmills be designed for mass-production and the capability to produce power competitive with that derived from fossil fuels, said Joe Holmes, Boeing spokesman. If 100 windmills are built using the MOD-2 design, the power they generate will cost about five cents a kilowatt, Holmes said, slightly higher than the four cent national average. However, the more windmills built, the more the cost will decrease.

Early tests at Goodnoe Hills produced electricity for the first time on Dec. 22 at 8:30 p.m. when 140 kilowatt-hours were generated in 11 minutes. Top capacity of each windmill is 2.5 megawatts. Together, they will average enough energy to power about 1,400 homes for one year. The



The MOD-2 windmills were designed to be mass-produced.

power produced by the Goodnoe Hills "wind farm" will be purchased by the Bonneville Power Administration (BPA) which will integrate it into its regional system.

But MOD-2 is only a beginning for the BPA. In February, it awarded a \$279,000 contract to Oregon State University for a

wind energy study in which researchers will identify areas in the Northwest capable of supporting wind energy farms.

According to the BPA, seven sites already identified together could produce about 1,000 megawatts—as much power as a large thermal plant.

—Cathy Stone

TALKING BACK

GRAVE YARNS

When people die, they are usually buried and their relatives come to visit and that's that. Well, Stan Zelazny has come up with a solution to those boring Sunday afternoons at the cemetery.

He has designed the "Talking Tombstone."

for example, may enjoy Neil Armstrong's sugary "Preserving Children": "Mix the children with the dogs and empty into the field, stirring constantly...Cover all with a deep blue sky and bake in the hot sun...."

Or, for a tart dessert, sample

A person can record a 90-minute message that will be played on a continuous audio loop from a solar-powered unit attached to the tombstone. Zelazny, a manufacturing engineer from Sunnyvale, California (where else?), can guarantee it for two generations. The service costs \$10,000 (making it eligible for the next Neiman Marcus catalog) and, until the word spreads, Zelazny himself is

Fidelity Monument Works' only customer.

But that may change. On the *Tonight* show recently, Ed McMahon suggested Johnny Carson leave behind a final monologue for people who want to visit his grave site.

No, Carson replied, he wants McMahon to tape a special introduction that says, "Heeere lies Johnny!" —Bob Greenberger

space artist Chesley Bonestell's "Brandy Manhattan": "The first glassful will relax you after the day's stress, the second will revive your spirits. A third, and you will experience a sensation of taking off into space with no need of technology nor any expense to

the taxpayer."

The *Famous Personalities of Flight Cookbook* is available for \$4.95 plus \$1.75 postage/handling from the National Air and Space Museum, Smithsonian Institution, Washington, D.C. 20560. —Barbara Krasnoff

THE FLOODING OF FLORIDA

If you are planning any long-term land investments in South Florida, you might be wise to consider the results of a study released by the National Center for Atmospheric Research. Its findings warn that by the next century as much as one quarter of Florida could be under water, including the sunshine state's famous east coast. The white sands and condominiums of Miami Beach, Fort Lauderdale and West Palm Beach could be inundated, while areas as far inland as Orlando would become beach front property.

Geologically speaking, Florida's coastline has never been a static one. Terraces from eight different ancient shorelines have been carved on the state by the sea's cyclic advance and retreat. With each glacial age, ocean levels have risen and fallen as large quantities of sea water were locked up in the ice of advancing glaciers and then released during warmer periods. The total change in the ocean's level has been about a 100 meters in the 10 to 15 thousand years since the end of the last Ice Age; but in recent ages fluctuations have been less dramatic, only about one millimeter per year. What could bring about such a disproportionate change in only one century? The answer is humanity.

In the last few millennia there has been a natural cooling, leading some scientists to suggest that we have begun the climatic swing toward another glacial age. Now that cycle seems to have been broken by the introduction of massive amounts of carbon dioxide into the atmosphere by industrialization. Between 1880 and 1970, a time of snowballing dependence on fossil fuels, the CO₂ content in the atmosphere rose 10 percent. This figure could double before the turn of the century, in one third of the time of the original increase. A greater reliance on coal, as oil supplies dwindle, will result in even larger quantities of CO₂ being produced and these predictions, dire as they may seem, could fall woefully short.

FUTURE CYCLE

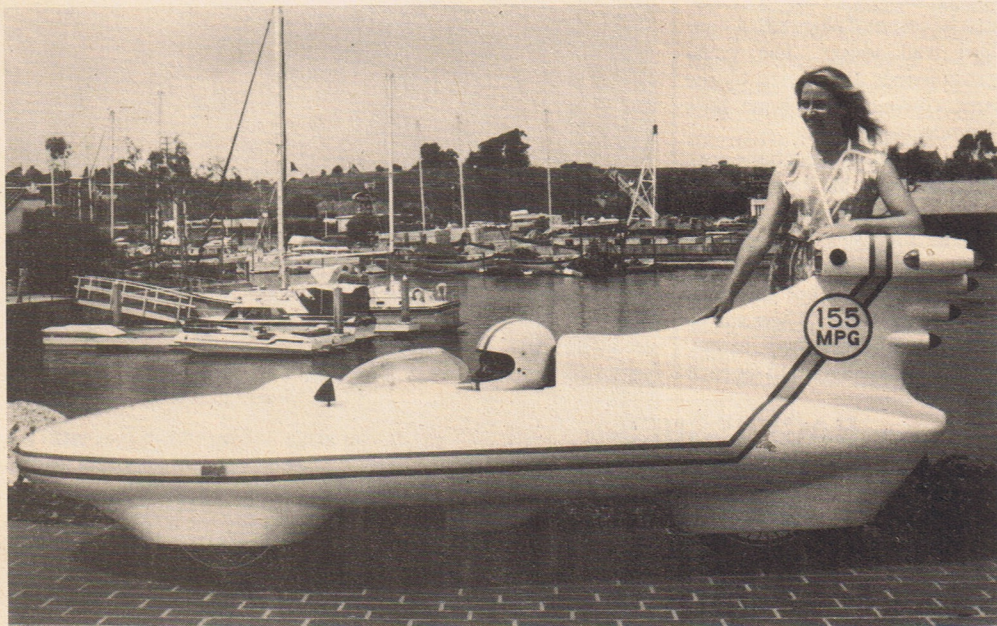
In the future, Americans could be commuting to work in what resembles a smaller-sized version of Luke Skywalker's land speeder, according to Aerovisions, Inc. of Irvine, California. Unlike the ground-effects vehicle of the movie, the single-seater California Commuter travels on three wheels and is based not on radical new developments, but refinements of existing technolo-

gies. Powered by either a Honda 90 cc or 200 cc engine, the Commuter is essentially a motorcycle clothed in an aerodynamically clean, fiberglass skin, weighing only 230 pounds. A single rear stabilizer houses an integral roll-over bar along with the headlight, taillights, and turn signals. The smaller engine delivers 155 mpg at a sustained 55 mph, but with only 10.5 horsepower it may not be legal for highway use in some states where there are minimum power restrictions. Large enough not to be affected by these laws,

the 200 cc engine produces 100 mpg while cruising at the legal speed limits.

Aerovisions, Inc. will be glad to fill your order for a California Commuter. They are located at 14962 Merced Circle, Irvine, CA 92714, and are presently offering a tech brochure for \$3 and plans for the California Commuter for \$15. Prices for the vehicle itself start at \$4,000, but if you think you'll need more room, plans are currently under way for a two-seater model.

—Christina Westcott

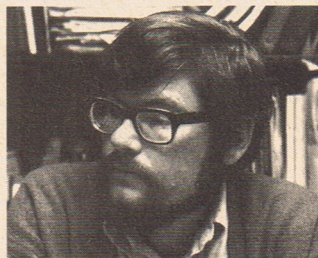


This rather weird-looking vehicle is actually an advanced type of motorcycle.

AWARDS

1980 NEBULAS

The annual Nebula ceremonies have come and gone, and once again the members of the Science Fiction Writers of America have chosen their favorites among 1980's science fiction. This year's winners of the Nebula Awards, which were announced at an April 25 banquet at the Waldorf-Astoria in New York, were:



Gregory Benford

Best Novel: Gregory Benford for *Timescape*, published by Simon and Schuster. Best Novella: Suzy McKee Charnas

for "The Unicorn Tapestry," from *New Dimension II*, edited by Robert Silverberg and Marta Randall and published by Pocket Books. Best Novelette: Howard Waldrop for "The Ugly Chickens," from *Universe 10*, edited by Terry Carr and published by Doubleday. Best Short Story: Clifford D. Simak for "Grotto of the Dancing Deer," published in *Analog*. SFWA's Grand Master Award for meritorious achievement in the field went to Fritz Leiber.

Excess carbon dioxide in the atmosphere prevents the escape of heat from the planet into space, instead reflecting it back to the ground, warming the Earth. If the CO₂ content continues to grow at its present rate, the "greenhouse effect" could result in a worldwide temperature in-

crease of three to four degrees during the 21st century. The polar regions have a delicately balanced ecology, several times more sensitive to variances in temperature than other parts of the world, and these few degrees could be enough to cause some melting of their ice sheets.

Liberated sea water, flooding back into the world's oceans, could raise the level of the seas as much as 15 feet, with devastating effects on South Florida—especially when you consider that Miami International Airport is only 10 feet above sea level.

—Christina Westcott

FUTURE PHONE

SHOW 'N' TELEPHONE

Remember all that chatter some years ago about video telephones? Predictions were that someday soon we'd all be talking in front of view screens a la the Jetsons. So what happened?

Ask Jerome Lemelson and Christian Grund, co-holders of patent 4,258,387, a portable telephone with a black-and-white television camera and a five-by-seven-inch screen. Utilizing the latest in microelectronic technology, the system can fit into an attache case and plugs into a standard wall socket. The visual transmissions are carried by the same conventional phone lines that now carry audio.

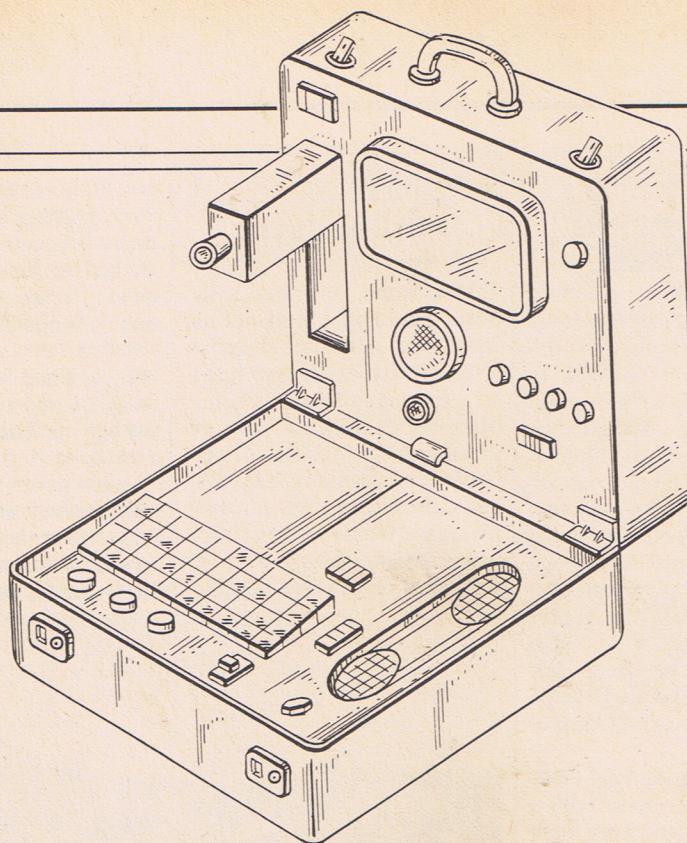
In a non-visual telephone conversation from his Park Avenue office, inventor Lemelson, president of Licensing Management Corp., said that the video phone has advantages for both personal and business calls. "There will be a lot of mothers, fathers, lovers, children who will want to see each

other, while businesses could transmit pictures of documents. It also has applications in the field of conferencing." In a modified form, said Lemelson, a keyboard

could be used to transmit typed messages.

At this point, Lemelson and Grund are still raising money to develop their idea, and are

negotiating with a manufacturer. Lemelson expects the invention to be on the market within a year, and that it will sell in the range of \$1,000 to \$2,000. —Bob Woods



ART COURTESY JEROME LEMELSON

BACK ISSUES



#1—Backwinding Super-8 Film; Foreground Miniature Technique; Aerial Brace Construction.



#2—Spaceship Modelmaking; Blood Makeup; Smoke Generator; Light Beam Effects; Making an SF Logo.



#3—Robot Construction; Developing an Animation Style; Fluid Art Animation; Electronic Special Effects;



#4—Aerial Image Optical Printer: Construction; Wire Armatures; A-B Rolling; More Electronic Special Effects; Fog and Mist Effects.



#5—Aerial Image Optical Printer: Usage; Widescreen Super-8; Slit Scan Effects; Gleaming Eyes for Stop-Motion Models.



#6—Amazing Electronic Gadgets—Cheap; Bring Your Alien to Life—Latex Masks; Basic Editing Techniques; Invisible Man Effects.



#7—Basic Cartoon Animation; Claymation; Kaleidoscope Effects; Profile: Santostephano

If you are a young filmmaker with a special interest in science fiction, special effects and the limitless magic of the cinema . . .

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THE EASIEST CHAIR

There you sit in your hot tub, wearing your Earth Shoes and listening to your learn-at-home meditation tapes—and you still have not achieved that blissful state of Nirvana. Fear not—help is on the way, courtesy Purpose I.

Billed as a new psychothera-

peutic tool, Purpose I was unveiled recently in (you guessed it) California by Drs. Jean Sanchez and Dean Sterling, designers of the implement of relaxation. Purpose I consists of a computer and 26 sensory stimulators incorporated into a commercially available, fiberglass, egg-shaped chair. That's right, all the answers of the universe in a simple chair.

But it's not really that simple a devise. Included in Purpose I are an electronic, computerized

memory and a modified, four-track tape player. The "client" leans back and is treated to analog therapy messages (voices, sounds and music) from two tracks, while the remaining two tracks are simultaneously used for digitally recorded "computer talk," which command the computer to kick in the "sensory stimulators" (kinesthetic, visual and olfactory) at the appropriate times.

The so-called psychotherapeu-

tic functions are culled from various techniques, including hypnosis, sublimation, self-esteem psychology, various psychotherapeutic theories (Jungian, Freudian, gestalt, etc.), and music and meditation therapy.

According to Drs. Sanchez and Sterling, the whole idea, as determined from their studies, is that lasting change happens in the types of therapy that incorporate the principles of both conscious and unconscious processes. Purpose I, they say, engages the conscious mind of the client with verbal messages "spoken" through the speaker. While the conscious mind is thus employed, the unconscious mind begins to receive non-verbal messages especially directed to it. Mechanically, these messages consist of 12 visual, 12 kinesthetic and two olfactory stimulators.

Purpose I claims to be effective against quite a host of everyday maladies, ranging from emotional problems (depression, psychoses), physical problems (obesity, cancer), bad habits (smoking, nail biting), vocational enhancement (communication, sales techniques), and growth facilitation (intuitive development, hypnotic regression).

And if nothing else, it looks like a pretty comfortable chair.

For more information and prices on Purpose I, contact Purpose, 5029 W. Point Loma Blvd., Suite C, San Diego, CA 92107.

—Bob Woods



In the new Purpose I relaxation chair, Californians will be really laid back.

PHOTO COURTESY: PURPOSE

IN THE AIR

FLIGHT INSURANCE

With only three weeks to go before the launch of the shuttle *Columbia*, NASA officials thought every last detail had been checked and rechecked. But leave it to the scientists and engineers to forget something really practical—like flight insurance for astronauts John Young and Bob Crippen. And at the 11th hour it was going to take more than simply sending someone to plug coins into one of those airport insurance vending machines. Enter Corroon and Black.

A Washington-based concern that specializes in insuring space risks, Corroon and Black came to

Young and Crippen's rescue. "We only discovered about three weeks prior to the originally scheduled launch that nothing special was being done for them," recalls James W. Barrett, president of the firm. Following discussions with people at NASA and the National Space Club Scientific and Educational Foundation, which promotes rocketry and astronautics, Barrett decided to phone the presidents of the nation's largest insurance companies. His mission was to solicit donations to pay for two \$800,000 policies. Eight companies finally came through. "There was a high

amount of altruism running through this whole thing," says Barrett, "on our part and that of the insurance companies who put up \$100,000 each. It was a gesture on the part of the insurance industry to the space industry to let them know that the insurance industry is interested in the exploration of outer space and foresees the economic opportunities that undoubtedly sit there in the decades ahead."

Corroon and Black has been in the business of insuring space projects for nearly 20 years. "Our current and existing life is in the telecommunications field," says Barrett. This includes launch failure, satellite flight and launch liability insurance, as well as service interruption insurance. This

last category protects against losses incurred when, for instance, a communications satellite goes on the blink.

This is the first time the company has insured human beings. Barrett points to the real reason for his firm's interest in the astronauts. "I'm not reading the Hardy Boys anymore, but I still believe in heroes. And, by god, they're heroes to me. I just thought something special should be done for them. And, I must say, it's one of the most thrilling things I've ever done. I only made \$10—and I don't even want to reflect on what it cost us—but it was a great privilege. We had some fun and it all worked out well. We got them back home."

—Bob Woods



THE SHUTTLE ERA BEGINS

With the successful completion of the *Columbia's* maiden voyage, the United States is back in the space exploration business. In this Special Report, we examine the shuttle program itself, with the aid of NASA's Jesco von Puttkamer; review Rockwell International's movie about how the craft they built works; and, beginning below, survey the scene at blast-off from Kennedy Space Center.

By BOB WOODS

We just became a whole lot smarter." This brief statement, spoken by Astronaut Bob Crippen upon completion of his successful mission aboard the space shuttle orbiter *Columbia*, hits right at the heart of the matter. Strip away the hoopla—the flag waving, all those lines about being one up on the Russians, the criticisms over delays and postponements, about spending too much money while people are starving on the planet—and Crippen's words capture the essence of the shuttle's maiden voyage. Above all else, the incredible human achievement represented by the *Columbia's* mission is really the most exciting and important aspect of the entire event.

And it was an event, of superhuman proportions, from the fiery launch from Cape Canaveral to the nearly flawless landing in California 54½ hours later.

I enjoyed the unique privilege of...experiencing...the spectacular blast-off from the Kennedy Space Center on Sunday, April 12, 1981 at precisely 3.98 seconds after 7:00 a.m. As the brilliantly white spaceship lurched from Pad 39A, a different kind of history was in the making; different than the news of the President being shot, of military advisers in El Salvador, of more budget cutbacks, of the ever-rising crime wave, of human despair and misery. There is something boldly symbolic in

the image of a whole world focusing its eyes skyward as it watches the shuttle streak into the heavens. The word "uplifting" never meant so much.

It's not even worth going into Friday's scrubbing of the launch; it was so completely overshadowed by Sunday morning's scene. To be sure, there was extreme disappointment—to the point of cynicism and even outright anger—as the faithful departed after their early-morning vigil. Yet as they flocked back two days later, that air of frustration could not obscure the renewed drama of anticipation.

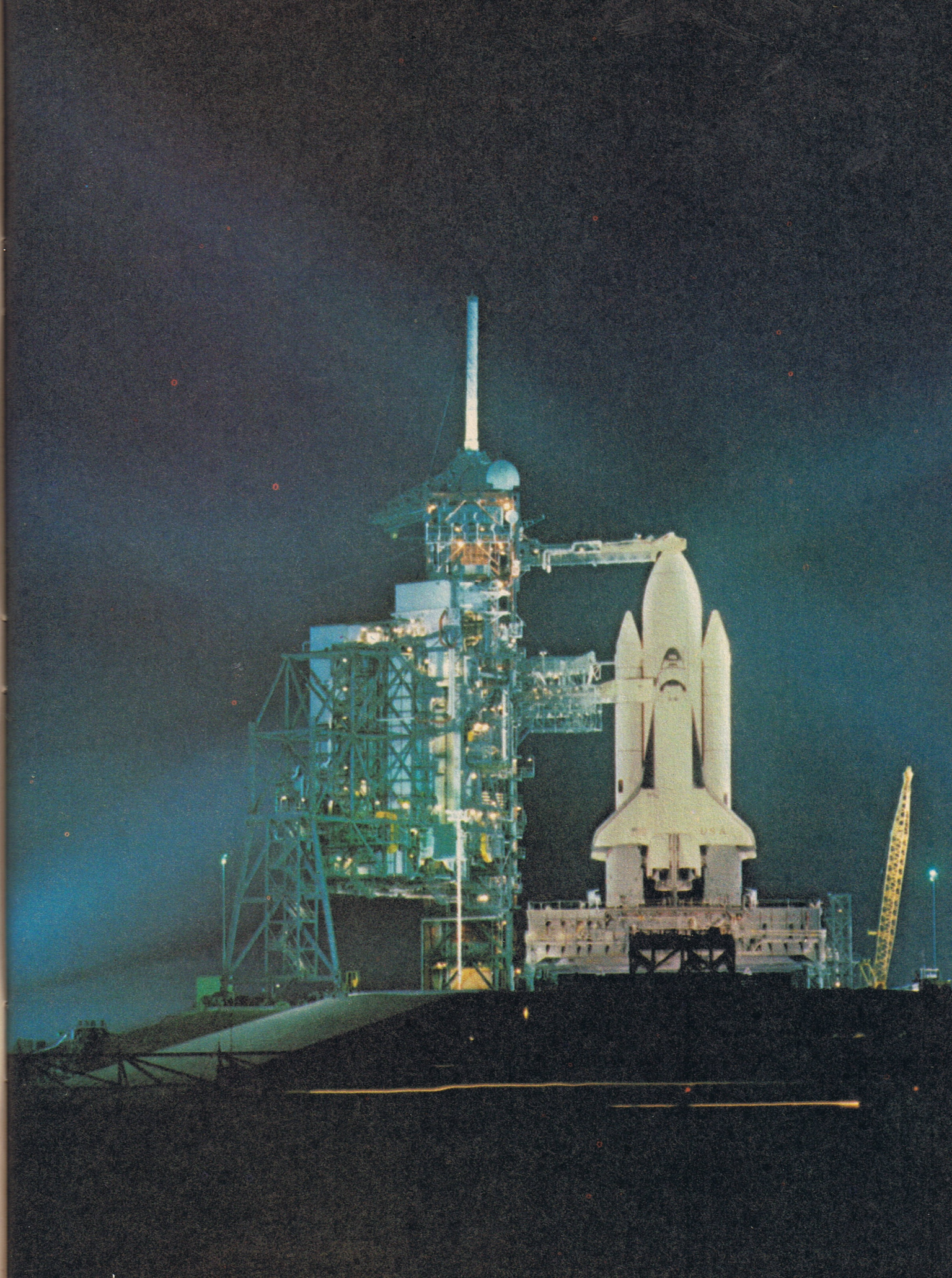
The official Press Site, approximately three miles from Pad 39A, was not what one would expect to complement the high-tech character of NASA. In fact, the atmosphere was more reminiscent of attending the U.S. Grand Prix auto races at Watkins Glen—right down to the craziness of camping in the infield, replete with a multitude of portable coolers and Winnebagos, and the all-night purring of their generators.

The Press Site was dominated by a large grassy field, fronted by a salt water estuary and backed by the press grandstands, a tin-roofed, terraced block of concrete outfitted with phones and a bank of closed-circuit TV monitors. To the right was a huge tent, filled with tables for the "working press." Behind the grandstands were two beige-colored, trailer-like buildings from where the

press could arrange for interviews, tours, photos, etc. And beyond a chain-link fence to the left were the VIP bleachers.

From this vantage point the naked eye could see straight out to Pad 39A, its most prominent feature being the 154-foot external fuel tank and the steel gantry. But there were few naked eyes. Most were pressed tightly to binoculars, cameras of every size and shape, telescopes and any other conceivable optical enhancer. After all, this was guaranteed to be a photographer's holiday. (*Time* magazine had a team of eight photographers, one assigned just to cover the coverage.) The whirl of camera motorwinders became commonplace. One of the more impressive set-ups consisted of a homemade, swiveling wooden stand, to which was bolted a four-foot telescope with at least a six-inch diameter lens. Near the top of the lens was affixed a small movie camera. (If the owner of this outfit is reading this article, please contact us; we'd would love to see your movies.) Then there was the guy with the gigantic lens slung over his shoulder who told his friend to "bring up the big lens." But one of the oddest sights was that of the spindly-legged camera tripods propped up everywhere; especially at night, when their owners and cameras were somewhere else. It

Enshrouded in an eerie white light, the shuttle awaits its appointment with destiny.



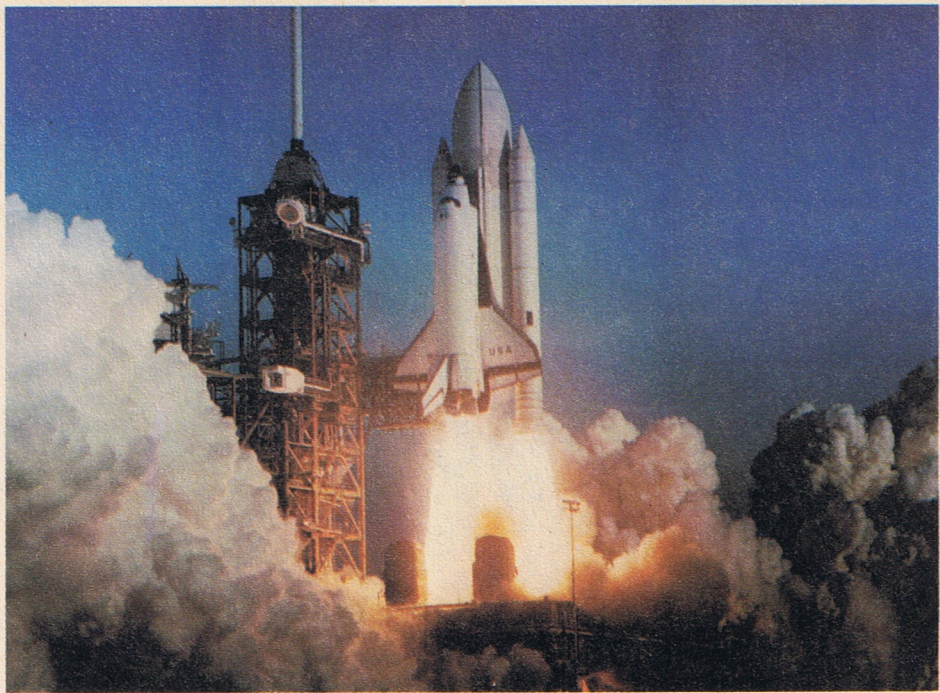
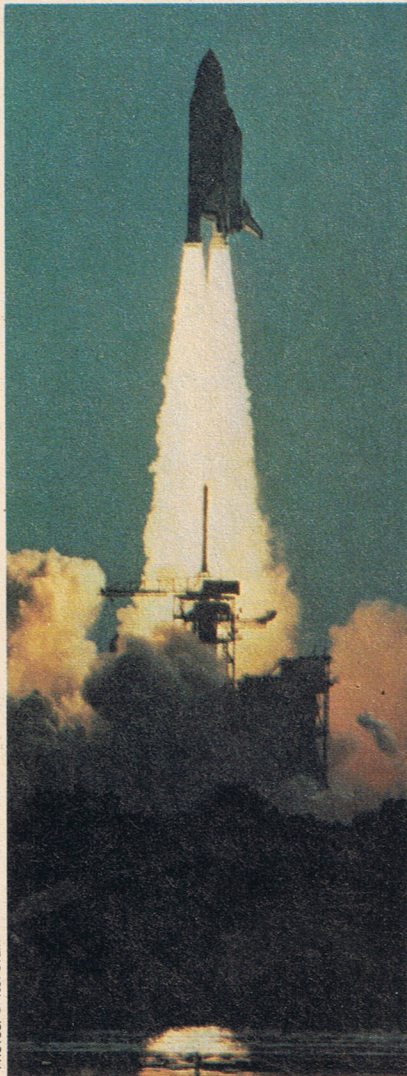


PHOTO: NASA



PHOTOS © 1981 CTEIN

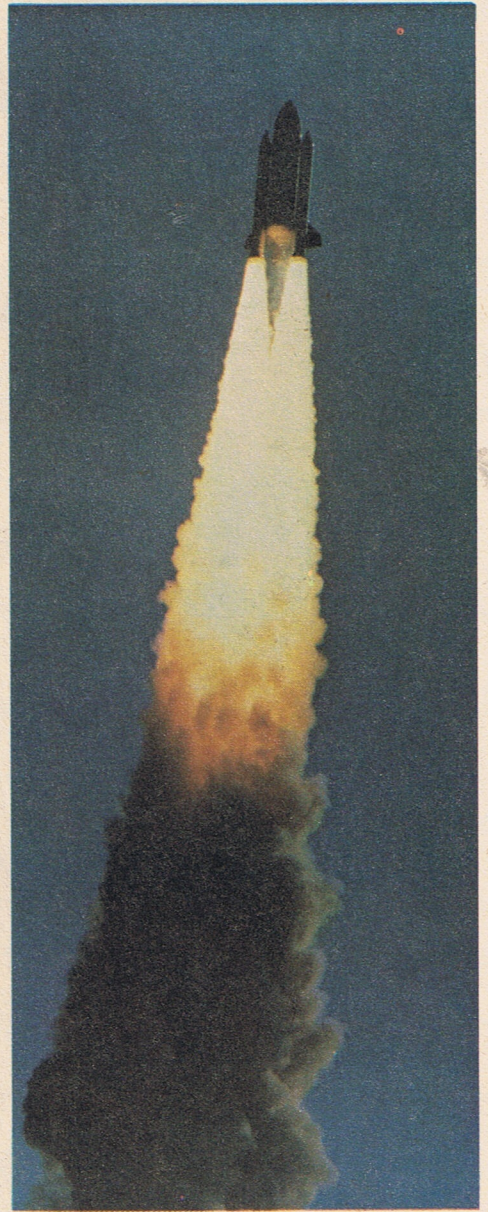
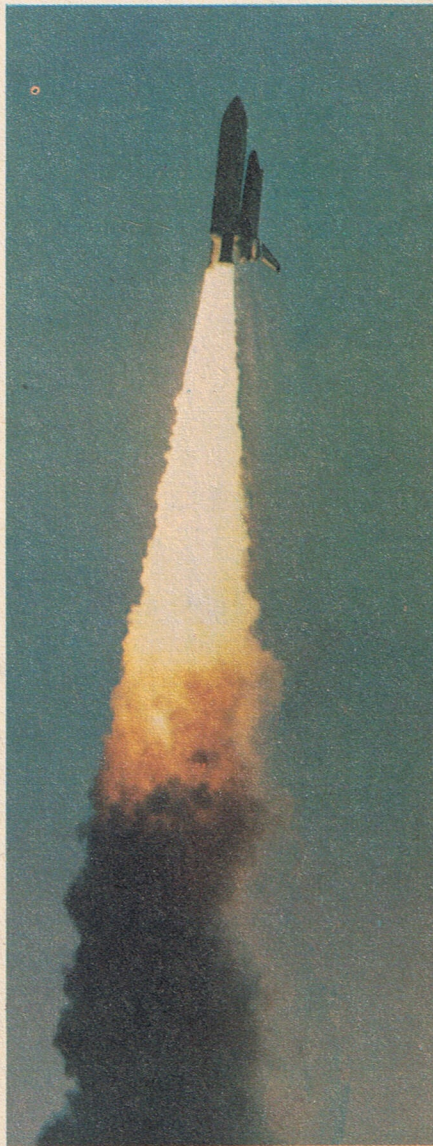
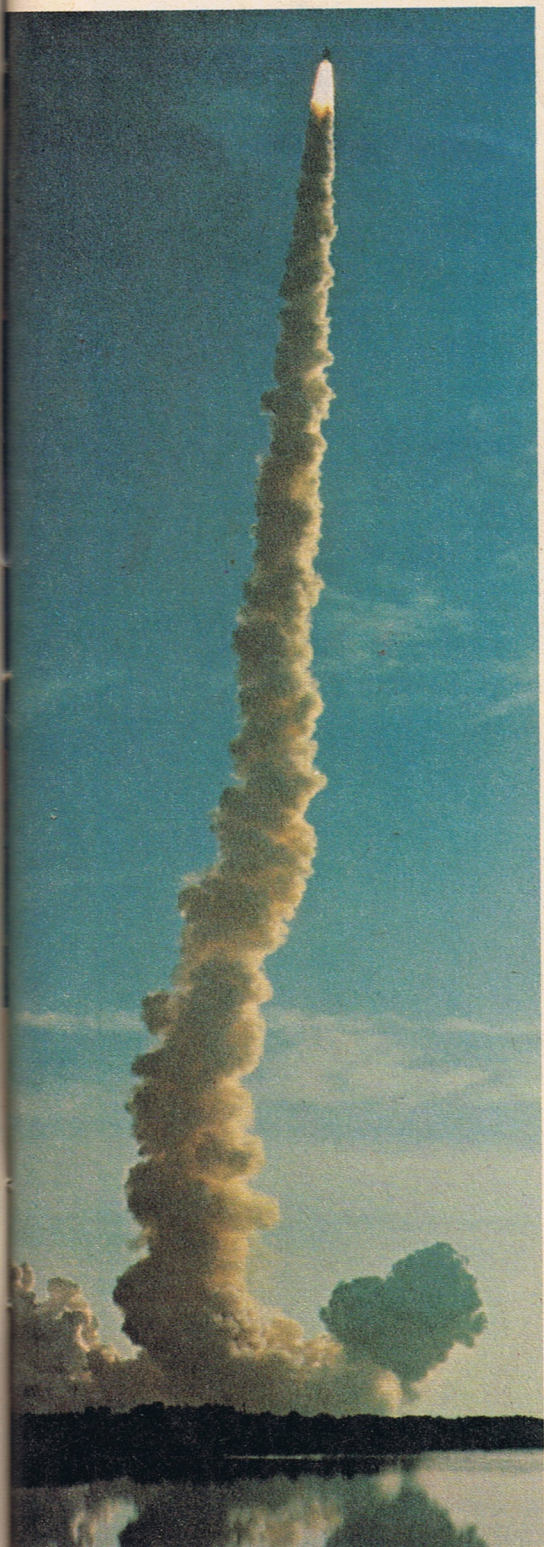
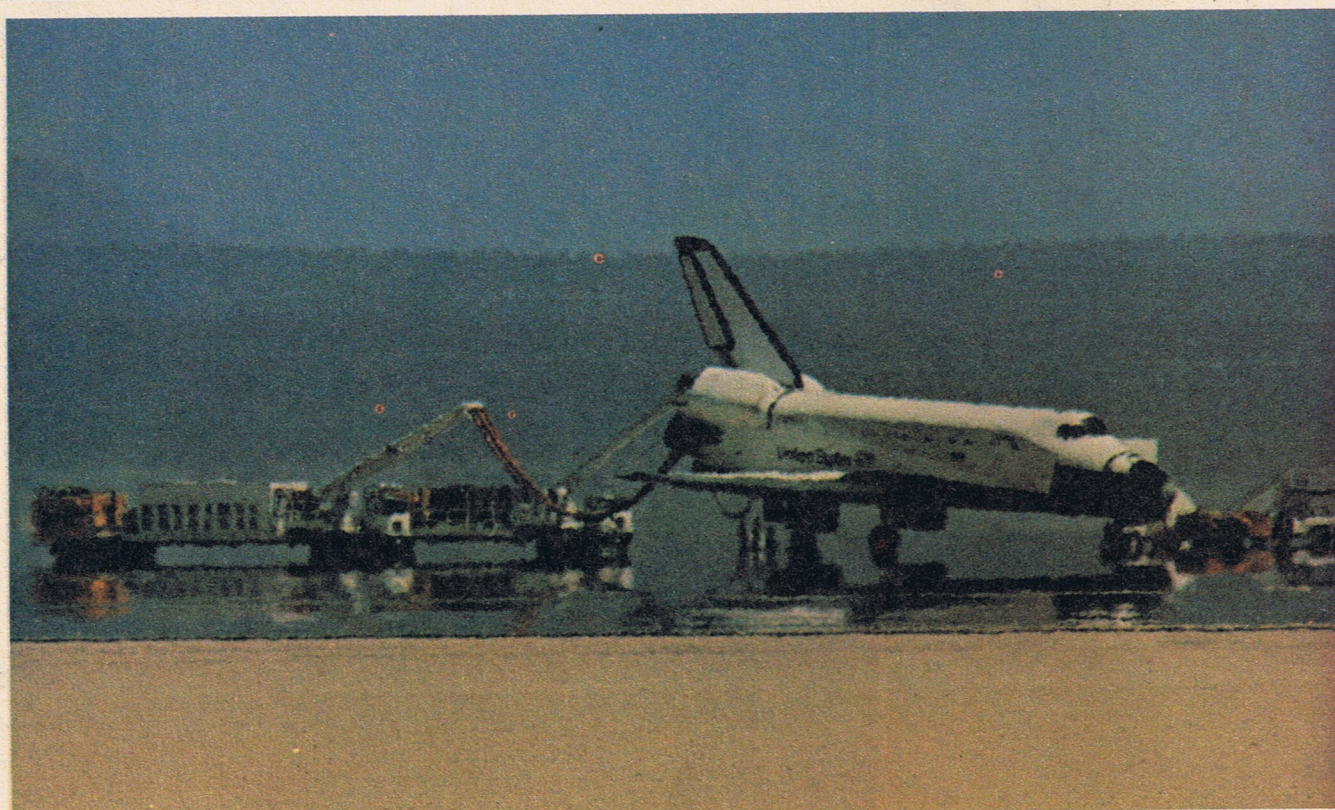
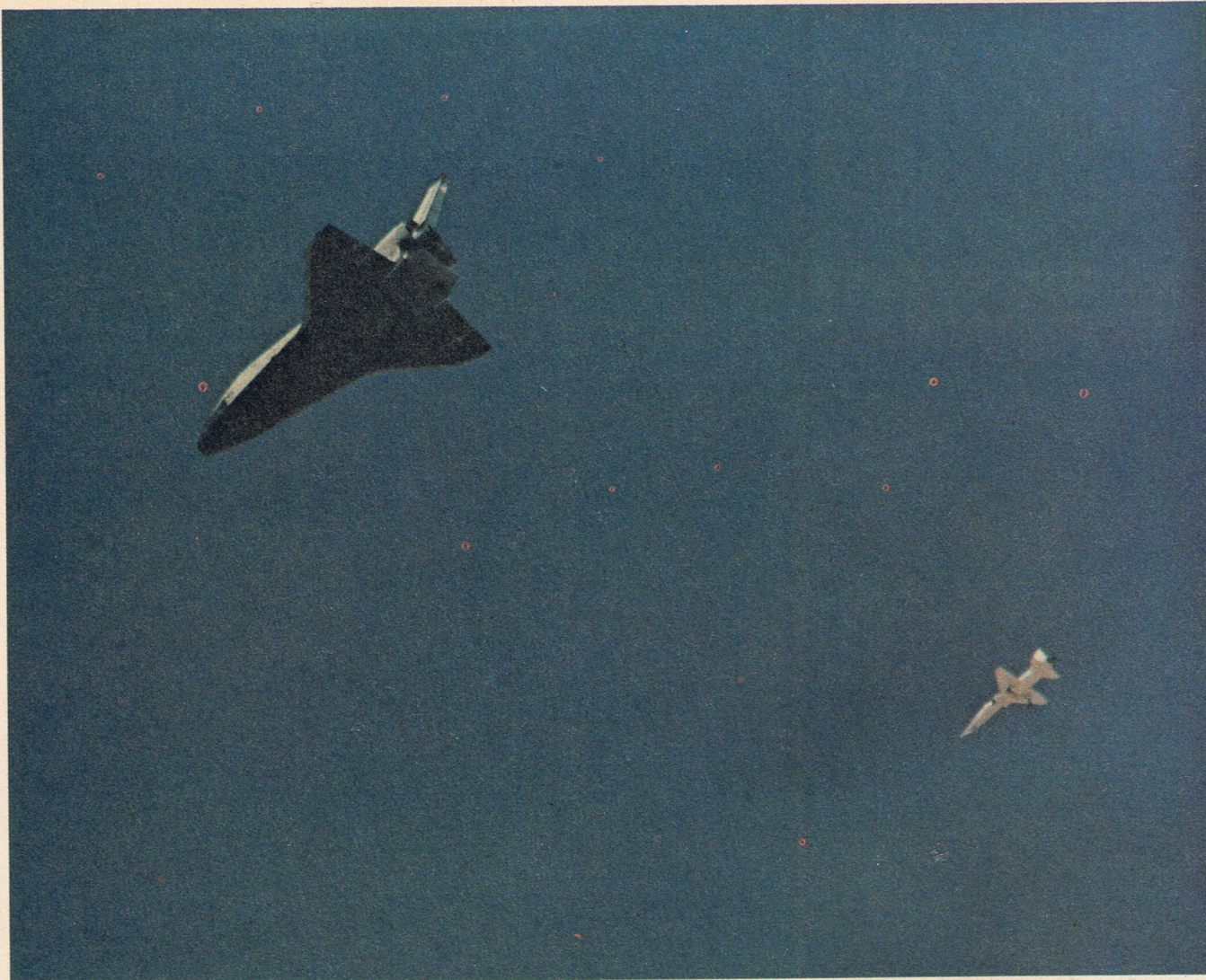


PHOTO © 1981 TERRY A. GAREY

BLAST OFF! A few seconds past 7 a.m., April 12, 1981. The first mission of the *Columbia*, officially known as STS-1 (Space Transportation System), is on its way. Most of the flame and smoke is coming from the solid rocket boosters. You can barely see the exhaust from the three, cleaner-burning main engines on the orbiter itself. This sequence also clearly follows the *Columbia* in its rollover, as the entire assembly rotates and arches into space. (For more Ctein photos, turn to pages 37-39.)



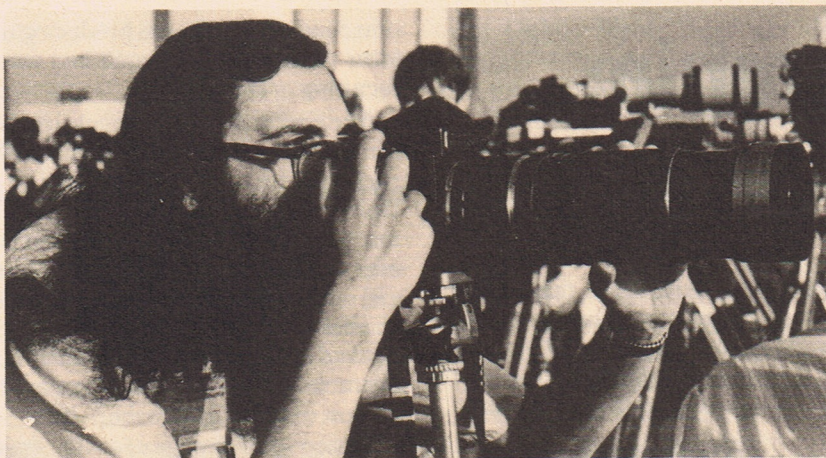


Moments after its successful landing, the orbiter is cooled down and its engines are purged of all remaining fuel.

PHOTO: © 1981 CTEIN



PHOTO © 1981 TERRY A. GAREY



Most of the extraordinary photos in this shuttle report are the handiwork of Ctein (shown here at work at the launch site), a California-based shutterbug with an extreme fascination with the space program. What makes his efforts even more herculean is that he and two co-workers, Terry Garey and Doug Faunt, drove from Kennedy Space Center in Florida to the landing site in California. And they made it—despite a stop in Texas for a valve job and another in Palm Springs for a speeding ticket—with 15 minutes to spare! For more on this amazing photographer, his odyssey and his work, including a magnificent centerfold, turn to our special Gallery, beginning on page 37.

looked like a midnight gathering of mechanical spiders.

Exiting from Interstate 95 at about 5 a.m. that Sunday, still 30 miles or so from KSC, I could easily see the spokes of white light diffusing into the dark sky, an image created by the floodlights beamed onto the sparkling white shuttle assembly. Everything looked pretty much the same as it had two days earlier, though the members of the press corps seemed to carry themselves with more confidence—probably the effect of Friday's dry run. Even the voice of Mission Control coming across the PA system sounded less official and more this-time-it's-for-real. . . .

The built-in hold at T-minus 20 minutes came and went as scheduled, with "everything going very smoothly," the voice from Mission Control assured us. A bright sun rose from behind the gangly structure, whose only sign of life was a faint plume of white steam oozing from the top of the external tank. But each of us knew that below that seemingly insignificant puff sat millions of pounds of explosive thrust just waiting to be switched on.

"T-minus nine minutes and holding." Another built-in stop in the countdown—this was as far as they got on Friday, so more than a few palms began to sweat and fingers to cross. Mission Control signalled the all-systems-go from other NASA ground stations around the globe, and the high sign came from the computers that had nixed Friday's launch. Photographers made their

final adjustments. I focused my binoculars on that thin stream of smoke for the umpteenth time. Ten minutes never ticked by more slowly. Hardly anyone noticed the three dolphins playing—or whatever it was they might have been doing—in the estuary a few yards from those hundreds of focused lenses.

A cheer went up as the lights of the huge digital clock near the water's edge flashed the continuation of the countdown. Another exhilarated cry came from the press area at T-minus five minutes. At the two-minute mark there seemed to be no turning back. The voice on the PA system started counting off the seconds at T-minus 15 seconds. Three...two...one....

What I remember most about the next ten seconds or so, as the two solid rocket boosters and the three main engines of the orbiter ignited in a fierce explosion of light and smoke, was the silence. I will never forget the noiseless beauty of those few moments. Even as the behemoth jumped off the launch pad in a violent burst of fire and smoke, singeing the grass for a mile around, I heard nothing. Then, like rolling thunder, the roar came. The best way to describe it is as an airquake, as opposed to an earthquake (I heard someone say that one NASA official describes blast-offs as "trouser shakers"). The sound was similar to the noise of a New York City subway station as two or more trains come rumbling through—squared. I honestly thought the shuttle might blow up, or that my ears might burst, as the intensity of the

roar grew and grew. Thunder claps, but this was more of a hard thudding. As much as the silent motion of the shuttle lifting off remains an unforgettable sight, that sound now resides prominently in my audio memory banks.

In the Gemini and Apollo days, rockets appeared to ignite and then slowly work their way into the sky. The shuttle shot up like a bullet. Within moments, all that could be seen of the huge assembly was the fiery glow from the solid rockets and their puffy, white clouds of exhaust arching into the blue yonder. Just after the T-plus two-minute 30-second mark, the crowds started spotting the booster rockets which had just been jettisoned from the external tank and were now floating from the largest parachutes ever made to an air rendezvous with NASA's specially built retrieval vessels. (They landed almost right on target and were soon after picked up by the ships, though not before someone had to warn away a Soviet trawler that was steaming toward the spent rockets.)

This was the last we saw of the shuttle from the Press Site, save for its misty trail of smoke. For several minutes many of us simply stood there staring, gaping into the sky. Others continued to cheer and applaud and slap each other on the back and generally exult. Within the next half hour there was a curious sort of exodus from the area. After snapping a few shots of the dissipating cloud of exhaust smoke, the photographers were gone, taking with them their giant lenses and spidery tripods. Almost immediately, the tapping of typewriters could be heard from both the grandstand and the "working press" tent as newspaper reporters rushed to get their stories of the liftoff into afternoon editions. Others filtered into the coolness of the press buildings to await the latest news releases, including a congratulatory message from a convalescing Ronald Reagan who had watched TV coverage of the launch from his hospital bed.

By the time the press conference, held in front of the grandstand, began at about 8:30 a.m., almost the entire grassy field had been vacated. A few local TV broadcasters were taping, using the now-empty gantry for their background. A few visitors still sat mute in the morning sun, trying to sum up their thoughts on the event they'd just experienced. I was one of those. E



The Columbia: How It Works

By JESCO VON PUTTKAMER

Jesco von Puttkamer, a long-time friend of this magazine, is a senior staff scientist for advanced programs at NASA's Office of Space Transportation Systems in Washington.

With the launch of the first space shuttle, *Columbia*, the U.S. space program is entering a new age. For the first time in almost six years of hiatus, American astronauts once again venture forth into space. Their emergence leads off manned spaceflight's second phase of evolution: the introduction of routine orbital operations and the stepwise achievement of permanent occupancy of space.

Whereas our previous efforts, which ended in July 1975 with the American-Russian Apollo/Soyuz rendezvous mission, can be seen as a period of learning and development of spaceflight know-how, emphasis in the imminent second phase—after an initial process of testing, maturation and demonstration—will shift to the operational utilization of near-Earth space. For this reason, starting in late 1982, the international spaceflight scene will come to be dominated by the space transportation system space shuttle.

Already during the past decade, this country's peaceful exploration and exploitation of space have sparked U.S. industrial capacity with new impulses, pouring out a cornucopia of practical applications of space technology in countless areas of daily life. Jointly, they have returned the original space investments to the nation many times over. In the coming years, new ventures in near-Earth space will strive for increased operational and nearly routine utilization of the cosmic environment for people on Earth. The key to this veritable revolution in our ability to take advantage of the unique attributes of orbital space is the lowering of transportation costs and the enlargement in size and mass of the

payloads carried to space, made possible by a space transportation system more economic, more capable and more flexible than the expendable rockets of the past, designed for one-time use only.

The New Space Transportation System

The introduction of improved transportation, be it larger-wheeled ox-carts, more seaworthy ocean-going vessels, better motorized vehicles or faster airplanes, has always heralded a dramatic rise in standards of living in all affected areas of the world. Thus, a century ago, the transcontinental railroad (opened in 1869) was the key element in the settlement and industrialization of the North American continent, while the DC-3 air transport in 1935 represented a second quantum leap in transportation which expanded continental horizons, shortened global distances and thoroughly revolutionized our modern world. For developed and developing countries alike, economical, reusable space transport will probably have a much stronger impact because it is designed to support and foster consecutive and expansive exploration, scientific experimentation, commercial processing and services as well as a large variety of beneficial satellite and manned space station applications.

In particular, the shuttle system has the potential to improve global communications, strengthen world-wide economics and further international understanding. Its services will enable each participating country to establish better and more economic means for weather observation and forecasting, for assessing and controlling its Earth resources, for improving navigation aids for airplanes and ships travelling domestically and between countries, for surveying and managing food crops and timber resources by their responsible authorities, and for increasing and enhancing scientific applications such as oceanography, atmospheric physics and astronomy. Its payloads will aid user countries in pollu-

tion control as well as in producing new ideas for materials research and manufacturing in space.

The essential novelty about the space shuttle as compared to conventional rockets is its capability not only to fly from Earth to space but also to return intact and to repeat this mission over and over, shuttling routinely between Earth and orbit and, thus, operating much like an airplane. Its reusability has two principal advantages. First, it results in considerable cost reductions as compared to the cost of spaceflight in the past.

A second advantage of major significance is the considerably reduced physical stress on humans flying the shuttle, made possible by its design. For example, thrust acceleration never exceeds three g's, as compared to 7-11 g's on conventional launchers. This means that non-astronaut scientists and technicians can now go into space for the first time along with the extensively trained astronaut-pilots. These so-called mission specialists—both male and female—can conduct scientific research tasks and technological developments in orbit "on the spot."

Thus, humanity's most valuable role in space during the '80s, at first, will be as experimenters. As such, the human can contribute significantly in a variety of ways. As a technician, he can set up experiments, make alterations in equipment, change film, reprogram computers for new experiments and so forth. As a maintenance engineer, the shuttle "passenger" can perform routine periodic maintenance tasks such as inspection and refurbishment as well as unplanned and unexpected repair operations. However, in many research programs his most important function goes much deeper than in the previous two examples: Often the mission specialist will be an integral part of the experiment itself. On board the shuttle, the human as principle investigator can be as intimately tied to the research activity as in the Earth-based laboratory. Thus, the human brain can be made a part of the experiment.

The transportation of payloads to high-altitude orbits will be handled by special upper stages carried into low orbit inside the shuttle's cargo bay and launched from there into deep space. The role of the shuttle as a launch platform, an "orbiting Cape Canaveral," will also apply to future planetary

probes of NASA, such as the Jupiter probe *Galileo*, and of other "customers" of the new transportation system, including the European Space Agency's Spacelab.

The Technology of the Shuttle

The space shuttle is a two-stage transportation system consisting of four major components: the winged orbiter (second stage), the external fuel tank, the two solid-propellant rocket boosters (first stage); plus various upper stages, the ESA-furnished Spacelab, an advanced geostationary satellite system for shuttle communications (TDRSS), and a number of future growth systems, still under study, to enhance the shuttle's performance in the years to come and to extend its current limits.

The orbiter contains the compartments for pilots, personnel and payloads. Roughly the size of a DC-9 airplane, it can provide living space and a work environment for up to seven people for as long as seven days (longer with supplementary systems) before having to return to Earth. Its total length is 37 m (120 ft), its wingspan 24 m (80 ft) and its height 17.4 m (57 ft) with landing gear extended. The *Columbia* weighs about 68,000 kg empty without payload (151,000 lb). Its cargo bay, 18 m long and 4.5 m wide (60 ft by 15 ft), can carry single or mixed payloads up to 29,500 kg (65,000 lb) to an orbit of 275 km (172 mi.) or smaller payloads to higher alti-

tudes. On later flights, the orbiter will be equipped with a protractable, 50-foot-long manipulator arm (a second arm is optional), located in the cargo bay, which mission specialists on station in the shuttle flight deck can remotely operate.

The Faster Spacecraft

Moreover, the shuttle makes possible a drastic reduction of experiment lead time and a more straightforward and progressive accomplishment of research programs. It can do this in two ways: First, by reducing the experiment instrumentation development time. On conventional rocket launchers, the reliability of the experiment systems must be very high, in order for the instruments to last for the life of the mission without maintenance and repair. This reliability in turn requires extensive structural testing, vibration testing, space environment simulation testing, and final acceptance testing. With the shuttle, much of this testing can be conducted in orbit, and the demands on reliability may be reduced since the experiment can be returned to Earth in case of failure. The same goes for free-flying satellites and other facilities which are not only placed into orbit by the shuttle but also can be visited by it later for maintenance, service, repair or retrieval to Earth.

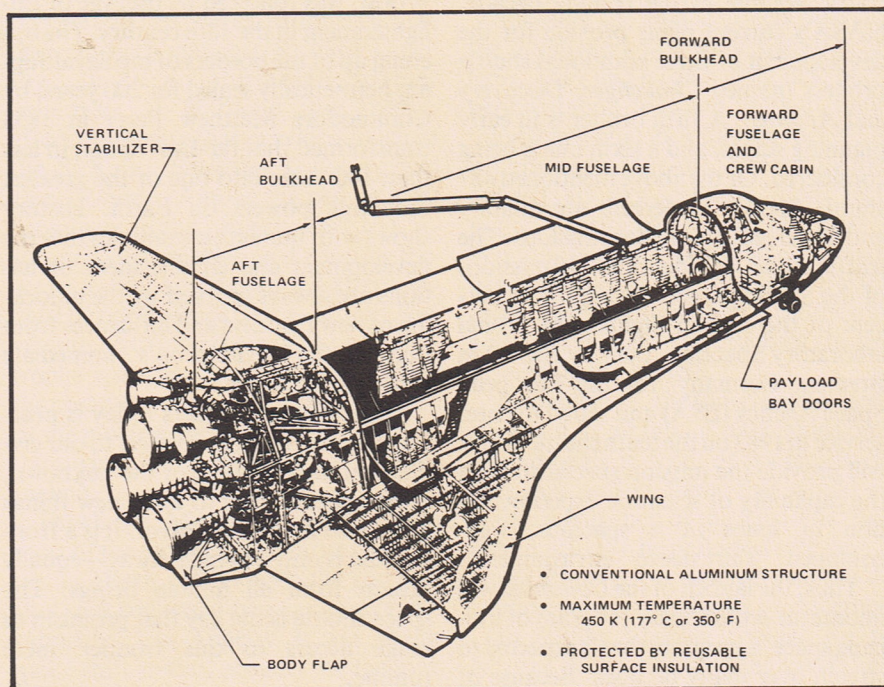
Another reduction in lead time results from the shuttle's capability to update experiments. Instruments can be ex-

changed in orbit without requiring the development and launch of an entire experiment platform or a new payload module as replacement. The presence of the experimenter on board the orbiter for conducting analyses, modifying procedures and re-calibrating measuring equipment not only allows flexible research activity by the specialist "on the spot" but also contributes significantly to the reduction of program lead time required to develop new operational equipment for future advanced applications satellites and space platforms.

With the space shuttle, it will become possible for the first time to conduct even large technological development programs in Earth orbit, such as the construction, assembly and maintenance of large structures which will be required for future telecommunications platforms, multi-beam antennas and other orbital systems designed to make space useful to people on Earth. Such large space structures will be needed in near-Earth orbit, particularly in geosynchronous orbit at 22,000 miles altitude where—as multi-function platforms—they would provide a solution to the rapidly approaching problem of saturation or orbit location and frequency spectrum by individual satellites.

To protect the orbiter and its crew from the high atmospheric friction heating during reentry, which will drive temperature extremes at the nose and wing leading edges to 1,700 degrees C (3,100 degrees F), the vehicle is clad in a coat of heat-resistant material which at once reflects up to 90 percent of the friction heat away, while insulating against another five percent. The remaining heat soaks through the aluminum skin of the orbiter during and after reentry, but so slowly that it can be removed after landing before doing damage by air cooling from gigantic air-conditioning units on the ground. Because the heat-proof material of the shield—baked and fused glass fibers with a ceramic coating—exhibits almost no thermal expansion, as opposed to the aluminum skin, it must be attached to the latter in form of individual blocks or tiles with corresponding gaps. The heat shield is made up of a total of approximately 30,000 blocks of various size and thickness, and weighs eight and a half tons.

The three main rocket engines of the orbiter draw their propellants—super-cold liquid hydrogen and liquid oxy-



ART: NASA



gen—from the external tank. On liftoff, they develop a combined thrust of 5.4 million newtons (1.224 million lb), or 6.8 million newtons (1.5 million lb) in vacuum, with a throttle capability from 65 to 109 percent of rated thrust. Connected to the orbiter by three support struts and five propellant feed lines, the tank has a length of 47 m (154 ft), a diameter of 8.4 m (28.6 ft) and is loaded with over 700 tons of cryogenic propellants. The only non-reusable element of the space shuttle, the emptied tank will be discarded moments before the orbiter reaches orbit. It reenters the atmosphere, disintegrates and falls into a remote area of the Indian Ocean.

The two solid-fuel rockets assist the three orbiter engines in overcoming Earth's gravitational pull during the first 130 seconds of flight. Each of these booster rockets develops a thrust of 11.5 million newtons (about 2.65 million lb). They burn out at an altitude of 42 km (138,000 ft) and are jettisoned loose. The high-strength steel casings, each 45 m (148 ft) long, 3.70 m (12 ft) wide and 84 tons (186,000 lb) heavy, return to Earth on gigantic parachutes and are recovered from the Atlantic Ocean by special ships for reuse.

NASA's Plans

The development of the shuttle has taken almost nine years. Officially established by President Nixon on January 5, 1972, the shuttle program got off to a fast start: only two months later, on March 15, NASA—as a result of intensive systems studies—decided on the concept of today's shuttle, utilizing two solid-fuel booster rockets. Four and a half years later, on September 17, 1976, the first orbiter—named *Enterprise* after the space vessel of the TV series *Star Trek*—made its first public appearance. In 1977, the *Enterprise* performed successfully in a series of five free-flight approach-and-landing tests, launched from the back of a Boeing 747. On May 1, 1979, the *Enterprise* was transferred to the Kennedy Space Center in Florida to serve as "pathfinder" vehicle for checking out launch facilities and procedures. On December 29, 1980, the *Columbia* was rolled out to the launch pad to take its place.

The first launch of the space shuttle *Columbia* represents the lead-off flight in a series of four orbital test missions which the *Columbia* must accomplish

successfully in the coming months. During this first mission, the only payload on board (other than mission-commander John Young and pilot Bob Crippen) was a cargo of 4,600 kg (10,195 lb) mass consisting of special instruments to measure and record the flight performance and induced environment of the orbiter. With approximately 3,000 sensors scattered throughout the *Columbia* and its external tank and boosters, data was taken during ascent, orbital coast and reentry. After processing, it is either stored in recorders in the *Columbia's* mid deck or transmitted to the ground.

The objective of the first flight was the attainment of an orbit of 278 km altitude (150 nautical mi.) and 40.3 degrees inclination. Mission length was just under 54½ hours. The subsequent three orbital test flights will execute increasingly ambitious flight profiles, and if everything goes according to schedule, NASA expects to be able to declare the space transportation system operational with its fifth flight in September, 1982.

The basis for NASA's planning for space shuttle operations after the test phase is the national "traffic model" for the space-transportation system, which currently lists a total of 487 shuttle missions between 1982 and 1994. In early 1981, close to 60 of these flights were already firmly booked by users, well into 1986. The trend is clear: The shuttle will be in great demand.

To accommodate the foreseeable high traffic volume in the coming decade, NASA's current plans provide for the development of three additional shuttle orbiters (named *Challenger*, *Discovery* and *Atlantis*). A fifth orbiter is in early planning stages, and a sixth one is being considered. Of the above mentioned 487 shuttle flights, 32 percent are military and 68 percent are civilian missions. The traffic model also identifies 110 missions of the Spacelab, accounting for 33 percent of the civilian flights. The orbital laboratory Spacelab, built by ERNO in Bremen, Germany, for the European Space Agency (ESA) and slated to enter service in 1983 on the tenth shuttle flight, will provide the mission specialists with the capability of scientific experimentation in space in a spacious, well-equipped, "shirt sleeve" environment.

Thus, the launch of the *Columbia* will initiate an evolutionary program of utilizing space, a program that is expected to stretch over many decades. Because of

its benefits to people on Earth, it will more than ever justify the efforts expended for its development in the past. However, the space transportation system is not only responsive to the practical demands on the space program, such as the creation of new technology, the increase of industrial competitive capability, the spawning of countless valuable spinoff products for our daily life, the strengthening of national security, the improvement of social economics, and—over the long term—the technical overcoming of warfare. It will also serve the more immaterial motives of space-flight as an expression of Earthlings' inexplicable thirst for knowledge, our fundamental urge to explore the unknown and our creative energy.

The significance of the shuttle for making manned spaceflight routine and for achieving permanent occupancy of space with an operations base in orbit during the '80s goes even further. (See the article on the proposed Space Operations Center in FUTURE LIFE #27.)

It was probably a matter of cause and effect that the colonization of the Mediterranean world by the Greeks preceded the Classical Age of Greek civilization. The Crusades and the Venetian trade connections with the Middle East were clearly among the key factors that led to the flourishing of the Renaissance. In Europe, the great era of exploration and discovery starting in the 15th century, including the opening up of the New World, was followed by the Age of Enlightenment in the 18th century. The opening up of the borders of medieval Japan, hermetically sealed for 200 years, by Commodore Matthew Perry in 1853 transformed that far-East nation in less than 100 years into one of the greatest economic powers on Earth. History shows with numerous examples that the development and enhancement of nations are always sparked by the unlocking of new frontiers and influences from outside the civilization's immediate sphere of influence.

One of these frontiers today is near-Earth space, because it offers to our civilization the challenge of the unknown, great opportunities to learn new things and a rich field of endeavor. It is a frontier that is only 200 miles away—equally distant from all human beings. The space shuttle is the key that promises to make access to this frontier mere routine.

E



Space Shuttle: The Movie

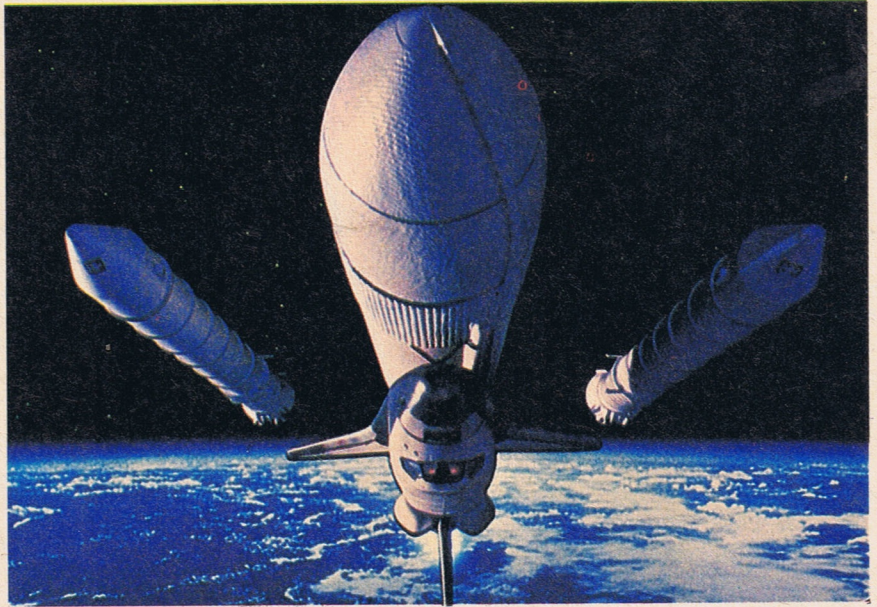
By ALAN BRENDER

During a few brief moments of the television coverage of the *Columbia*'s maiden voyage, science fiction and reality were wed. Using techniques developed to bring verisimilitude to such SF productions as *Star Wars*, *Battlestar Galactica* and *Buck Rogers*, a group of filmmakers had put together a presentation for Rockwell International (builder of the orbiter) on the phases of the space flight that TV cameras were unable to cover.

In past coverage of historic space exploration, TV networks relied heavily on animated depictions of the stages of spacecraft takeoff and re-entry that cameras stationed on the ground or in strategically placed aircraft were unable to capture. In the Rockwell footage, realistic representations of these stages were painstakingly filmed using models of the *Columbia*, mattes and computerized cameras. A single shot sometimes took days to film and went through computer-controlled cameras up to eight times to add all the detail that would ensure authenticity.

When Rockwell decided to produce a shuttle film, it contracted Metavision, a Los Angeles-based production company headed by Theo Meyer, to undertake the task. Project manager Richard Dowling, in turn, contacted former employees of Hartland (the special-effects company that provided much of the SFX for *Battlestar Galactica* and *Buck Rogers*). Among the people most prominent in the project was Jo Carson, president of National Motion Pictures, a company she started after leaving Hartland. Brick Price, a *Star Trek* veteran, provided the models; and electronics specialist Jerry Jeffries designed the computer controls for the operation of the movie cameras. Dowling directed the project, which was designed by Peter Inebnit.

Dowling's Metavision team filmed most of the movie at the Hartland facilities in North Hollywood; the rest was shot in a converted two-car garage in a suburb of Los Angeles. It was at this make-shift studio, actually the facilities



This model set-up of the shuttle assembly depicts separation of the solid rockets.

of David Stipes Productions, that FUTURE LIFE met with some of the people primarily responsible for the project several months prior to the actual take-off of the *Columbia*.

"This is the first time that motion control has been used on a fairly large scale to such a precise degree," says Dowling.

To utilize this technique, however, does have its drawbacks. "It's kinda ticklish," White admits. "In one shot where we had the two rocket boosters, the big tank, the shuttle and the rockets going off to one side of the solid boosters—that shot had eight passes."

Shooting the engine effects provided the filmmakers with some special problems. They had to do a great deal of experimentation to come up with something that would look like the rocket fuel is burning on take-off. Eventually they utilized an oxy-acetylene torch technique developed for *Buck Rogers*. Working with acetylene flames, though, has its problems. "We had to take extraordinary precautions to prevent the oxy-acetylene flames from cracking the lens or melting the camera."

In many cases, the film crew directed a stream of jet air (about 100 pounds pressure) directly in front of the lens to deflect any heat or flame that would get within a half-inch of the lens. That heat would actually be deflected sideways at about 70 miles per hour so that the deflection could not actually be discerned.

In putting together footage for re-entry of the shuttle, the filmmakers held

endless meetings with Rockwell officials on how to effect a red-hot glow on the heat-resistant tiles of the ship. "The problem," says Jo Carson, "is that they computer-simulated a glow, but nobody had ever seen it because it hadn't happened yet. After we decided where it glowed, what color it glowed and how long it glowed—then the experts scratched their heads and questioned whether or not they wanted it to glow."

A very important element in filming motion-controlled effects is the computer. "It's a real chore coordinating the non-real time act of the programming of the motion-control computer," explains White, "with real-time reality. It may take you 45 minutes or an hour to film a shot that will go by at sound speed in 30 seconds. The key, as in all motion-control systems, is repeatability. If you do a move on this machine once and you feed it into memory, it will always repeat exactly. That is what allows us to do eight passes through the cameras on one piece of film, put in the ship, put in carbon dioxide engines, put in oxy-acetylene engines, put in flashes of light to indicate explosive bulbs and to shoot a matte which is very important to allow us to lay the ship over whatever background we have chosen."

All the production equipment, to say nothing of the time of these various filmmakers, generated less than five minutes worth of actual material, which eventually was used by the major U.S. and foreign television networks as an editors' package to illustrate the mission. E

PHOTO: © 1981 ROCKWELL INTERNATIONAL METAVISION



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EMORTALISM

Curing Death

By PETER H. CHRISTIANSEN

"Some people want to achieve immortality through their works or descendents. I prefer to achieve immortality by not dying."

Woody Allen

The quest for eternal youth is gaining momentum. Scientists have extended the lifespans of laboratory animals and they say it is only a matter of time before they can do the same for us. When far-out futurist F. M. Esfandiary said a couple of years ago, "If you can survive the next 20 years, you may live forever," he was dismissed by many as too optimistic.

But Dr. Alvin Silverstein, chair of the Department of Biological Sciences at Staten Island College and author of numerous texts in the field of biomedicine, says in his latest book, *Conquest of Death* (Macmillan, 1979), "If you survive the next ten years, you may live on indefinitely in youth and vigor. . . we are at the threshold of a new era in which dying may no longer be inevitable." Dr. Silverstein has coined the word *emortality* to describe the modern scientific search for eternal life and youth. The prefix *e* means "out of" or "away from;" thus, emortalists are people who seek to move out of or away from mortality.

An emortalist "underground," promoting life-extension research, has existed for some years, but recently, encouraged by breakthrough advances in the bio-medical sciences, emortalist activism has begun to experience rapid growth. It may well emerge, along with space activism (see Trudy Bell's article

"Space Activism," FUTURE LIFE #22) as a major social/political movement in the '80s.

A directory of emortalist organizations appears at the end of this article. This directory does not include membership statistics, etc., because emortalist organizations are not membership organizations in the traditional sense, but rather they are independent educational and research foundations that welcome public participation. Also, because most emortalist organizations are so new, membership statistics, etc., are not really available yet.

Cryonicists are the original emortalist activists. Cryonics was pioneered by college physics teacher Robert C. W. Ettinger ("I aim to live forever or die trying"), who reasoned in his classic book, *The Prospect of Immortality* (1964), that medical science will one day be able to extend our youthful lifespans indefinitely, and even resuscitate people who die in the meanwhile and have their bodies (or brains) frozen. Although cryonics has not grown as fast as many initially thought it would, it has attracted a number of prominent scientists and others who have arranged to have their bodies or brains placed in cryonic suspension should they die before emortality is achieved. The one obvious drawback with cryonics, however, is that you have to die first. (For more on cryonics, see the cover story from FUTURE LIFE #24.)

Other emortalists, anti-aging activists, are engaged in heading old-age and "natural" death off at the pass by pro-

moting increased public support for basic biological and biomedical research aimed at chemical control of disease and aging. They know emortality is coming someday and they want to make sure it happens in their lifetime.

The Committee for Extended Lifespans is chaired by long-time emortality activist Stuart Otto who says, "Sooner or later death will be conquered. Why not make it sooner by starting now, thereby increasing the number of people who will be able to enjoy the fruits of the victory?" The CEL seeks to serve as a link between the world of research and the public-at-large. Its newsletter, *Life-lines*, condenses technical data into brief digests written for laypersons, and these reports are sent both to CEL members and to key media personnel throughout the world.

The Foundation for Bio-Integrative Education and Research (FIBER) grew out of meetings held in the office of California's senior U.S. Senator Alan Cranston beginning in 1978—meetings of scientists working to understand and control the aging process, and also attended by people from government, industry and private philanthropy. Cranston says, "We will one day soon be able to push our natural lifespans beyond the limits so long considered immutable. The rate of progress hinges on availability of funds and the scope of the programs we launch."

FIBER's advisory board includes a number of distinguished scientists such as Albert Rosenfeld, the noted geneticist and author of *Prolongevity*, who asks,

"Can we extend our lives without the ravages of old age? The question is not *if*, but *when*."

FIBER does not conduct its own laboratory research, but acts as a catalyst among research investigators studying the underlying causes of human aging, helping promising researchers obtain funds and facilitating their interactions with others in related fields to promote effective and rapid entry of new technologies into advanced experimental trials. FIBER also works to stimulate high-risk venture capital from the private sector to quicken the pace of discovery and the beneficial applications of new knowledge in the life sciences.

The Foundation for Research Against Disease and Death (FRADD) was founded by Dr. Alvin Silverstein, who believes, "Humankind, for the first time in history, possesses unlimited potential to shape its own destiny. We are on the verge of winning the age-old war against disease and mortality."

FRADD's advisory board reads like a veritable Who's Who of science and screen. It includes Buckminster Fuller, three Noble Laureate scientists and a number of Hollywood celebrities including Otto Preminger, Cary Grant and Elizabeth Scott. FRADD aims to speed up progress in the biomedical field by urging a clear and firm national commitment to the ultimate control and cure of all disease. It is working to establish better rapport between the academic and the industrial communities and to educate the public on the vital role of research in the conquest of disease and death. FRADD will soon begin publishing a mass-circulation magazine, and producing radio/television spot announcements and educational films dramatizing the importance of basic and applied research in biomedical advances, past, present and future.

Dr. Silverstein also intends to organize a second emortalist organization, The Association for the Conquest of Disease and Death (ACDD). Members of ACDD would actively lobby in Washington for legislation to increase the present rate of federal funding for basic biological and biomedical research from its present level of .5 percent to 2 percent. While FRADD highlights the emortalist program for the public, ACDD would see that members of Congress enact the legislation necessary to see the program is properly funded.

Anti-Aging News is published monthly by Saul Kent ("Immortality is coming. The quest is gaining momentum."), a long-time, highly regarded emortalist activist and author of *The Life Extension*

Emortalist Organizations

Cryonics Groups

- Alcor Life Extension Foundation
Box 282, Verdugo City, CA 91406
- Bay Area Cryonics Society
7710 Huntridge Ln, Cupertino, CA 95014
- Cryonics Institute
24041 Stratford, Oak Park, MI 48237
- Cryonics Society of South Florida
2835 Hollywood Blvd., Hollywood, FL 33020
- Cryonics Society of San Diego
4791 50th St., San Diego, CA 92115
- Hartman Help, Inc.
Stuart, Iowa 50250
- Institute for Advanced Biological Studies
c/o S Bridge, 2901 N. Pennsylvania St., Indianapolis, IN 46205
- Institute for Cryobiological Extension
13152 S. Blodgett Ave., Downey, CA 90242
- Life Extension Society, Inc.
1151 N.E. 1st Ave., Pompano Beach, FL 33060

Trans Time, Inc.

1122 Spruce St., Berkeley, CA 94707

Anti-aging Groups

- Alliance for the Future
1168 Kearny St., San Francisco, CA 94133
- Anti-Aging News
2835 Hollywood Blvd., Hollywood, FL 33020
- Committee for the Elimination of Death
P.O. Box 696, San Marcos, CA 92069
- Foundation for BioIntegrative Education and Research (FIBER)
2025 I St., Washington, DC 20006
- Foundation for Research Against Disease and Death (FRADD)
P.O. Box 2000, Lebanon, NJ 08833
- Foundation for Infinite Survival
The Claremont, Ashby and Domingo Avenues, P.O. Box 4000C, Berkeley, CA 94704
- International Re-evaluation Counseling Communities
719 Second Avenue North, Seattle, WA 98109
- Institute for the Study of the Human Future
Suite 1362, 2000 Center St., Berkeley, CA 94704
- Prometheus Society
102 Morris Dr., Laurel, MD 20810
- Theta Seminars
301 Lyon St., San Francisco, CA 94117
- American Aging University of Nebraska Medical Association (AGE)
Center, 42 and Dewey Aves., Omaha, NE 68105
- Long Life Magazine
PO Box 490, Chicago, IL 60690

sion Revolution. Kent has assembled a distinguished scientific advisory board consisting of some of the leading scientists now working in this rapidly growing field, and will soon announce the establishment of an anti-aging computer network, cable TV show and research foundation, all devoted to mobilizing support for life-extension research.

The Foundation for Infinite Survival, in Berkeley, California, maintains clinical and research programs in life extension and control of aging. William Everone, an advisor to the foundation, says, "Disease and death are our real enemies, not each other." The foundation has a number of scientists and physicians on its board of directors and advisors.

AGE (The American Aging Association) was founded by well-known gerontological researcher Denham Harman of the University of Nebraska, and is patterned after the American Heart Association. The group sponsors a quarterly publication devoted to biomedical research into aging and an annual scientific meeting.

Other futurist organizations such as The Alliance for the Future (formerly The Futurian Alliance), The Institute for the Study of the Human Future and The Prometheus Society promote emortalism as well as space exploration and other futurist thrusts. Two psychological-growth ("human-potential") groups that endorse emortalism as major goals are Harvey Jackins' The International Re-evaluation Counseling Communities (co-counseling) and Leonard Orr's Theta Seminars.

The dramatic proliferation of emortalist activism is also evident in the increasing number of books and articles in major magazines, from *The Reader's Digest* to *Women's Day*, that deal with the subject, and an award-winning documentary film *Stalking Immortality*.

All of this suggests that the life-extension/emortality movement is beginning to reach the "critical-mass" stage and that emortality, the conquest of time, is an idea whose time is rapidly approaching. Says famed author Alan Harrington (whose *The Immortalist* is considered a sacred book among emortality activists), "Death should no longer be considered any more an acceptable part of life than smallpox or polio, both of which we have managed to bring under our control. We have touched down on Mars and the Moon, artificially reproduced DNA and now have the biomedical means to control birth. Why should death itself, 'the last enemy,' be considered sacred and beyond conquest?" □



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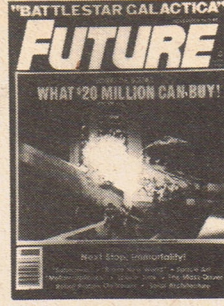
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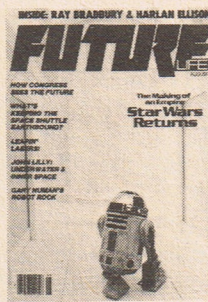
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SUPERMAN II

Leaving behind him three years of lawsuits, backbiting and political hilarity, the Man of Steel takes to the skies again.

By ED NAHA

Three years ago, surrounded by a ballyhoo of huzzahs and hype, comic bookdom's legendary Man of Steel took to the cinematic skies in the widescreen wonder *Superman—The Movie*. No pains were considered too great by either Warners Films or D.C. Comics to assure the world that *this* film version of the Kryptonian myth was the *definitive* one. It was better than the old cartoons. Better than the movie serials. Better than the TV series. Better than the comic books? Well, three out of four isn't bad.

With the film's release and instant popularity, its producers Ilya Salkind and Pierre Spengler announced immediate plans for *Superman II*. . . soon to be zipping into a theater near you! Their plans for the sequel proved a wee bit premature, however. Lawsuits, backbiting and general political hilarity slowed down progress on what was considered that rarest of celluloid animals: a box office sure thing. Today, *Superman II* is alive and well and about to be unleashed in America, although it's a considerably different film than the one announced back in 1978.

The beginnings of *Superman* II's problematic existence can actually be traced back to the inception of *Superman*. Salkind and Spengler had a 550-page script by Mario (The *Godfather*) Puzo, a \$50 million budget, Guy (Goldfinger) Hamilton as director and two stars, Marlon Brando and Gene Hackman, for their epic. The plan called for enough footage for two films to be shot simultaneously by Hamilton. Then, faster than a speeding bullet, all hell broke loose.

Hamilton bowed out of the project only a few months before production was to begin. Director Richard (The *Omen*) Donner was hired. With only 11 weeks to prepare, Donner was asked to

hire a leading man, replace an art director and scout locations. Oh yes, there was also a little problem with the script.

"It was campy," Donner recalled at the time. "There was one scene where Superman was looking for Lex Luthor. He spots a bald head in the street and flies down and grabs the guy. The guy turns around and it turns out to be Kojak. He says, 'Who loves ya baby?' and walks away. The script was filled with stuff like that."

Donner clashed with Spengler concerning the script. Spengler thought it was peachy. Donner thought it rank. Spengler thought it concise. Donner thought it overbloated. Eventually, David and Leslie Newman and Robert Benton were brought in for a re-write. In addition, Tom Maniewicz took a turn at a polish. (The final script credit was destined to look like a page out of the Manhattan white pages.) Spengler and Donner were destined to battle throughout the rest of the picture, with the producer attempting to fire the director midway through the shoot.

Chris Reeve was cast as Krypton's fave rave with Margot Kidder, Ned Beatty, Jackie Cooper, Terence Stamp, Jack O'Halloran and Sarah Douglas tagged for supporting roles. Shooting both films in tandem proved difficult. Budgets soared higher than any of the fictitious characters and special effects sequences took longer than planned. Also in the air was the tension generated by Spengler and Donner. "I told him to his face that the film was too big for him but he wouldn't face up to that responsibility," Donner stated shortly after *Superman*'s completion. "It had nothing to do with the film itself, it was the making of the film—the knowledge necessary to pull it off. If he had faced up to the problem we would have brought in help earlier and the schedule

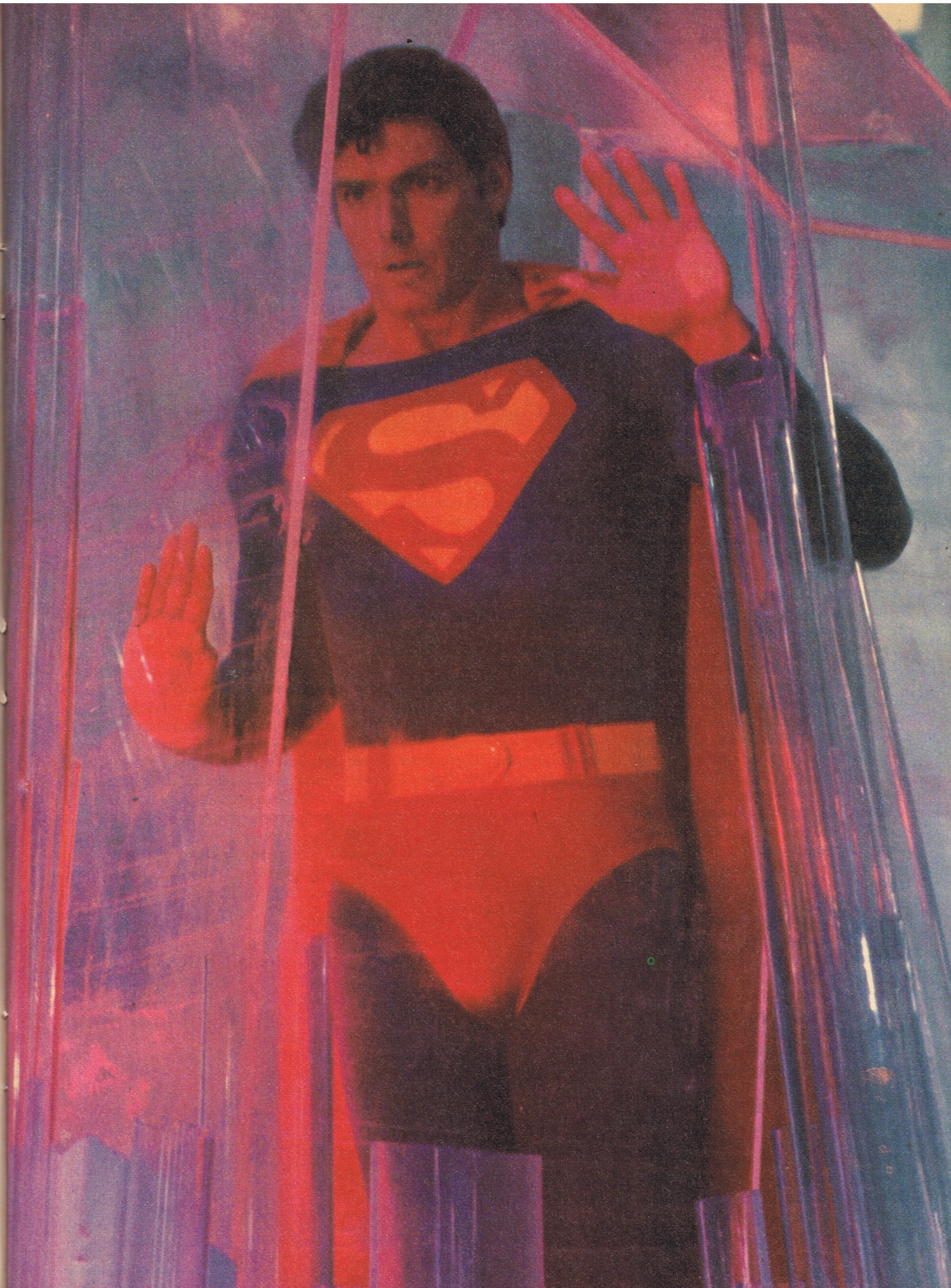
would have been tremendously different. But he didn't, so we ended up locking horns."

Director Richard (A *Hard Day's Night*, *Robin and Marion*, *Juggernaut*) Lester was brought in as a third producer; a mediator between Spengler and Donner. The first movie was filmed in its entirety. A good deal of the second, featuring three exiled Kryptonian criminals, Zod, Non and Ursa (Terence Stamp, Jack O'Halloran and Sarah Douglas), escaping from the Phantom Zone and wreaking havoc on the Moon and Earth, was also completed before production grinded to a halt.

Superman was released, was deemed successful and thus led to the announcement of the sequel. Then, with more impact than a chunk of kryptonite could ever possess, a series of glitches occurred that threatened to scuttle the project completely. Donner was not invited to continue to direct the second film. Lester was asked to replace Spengler as producer. Marlon Brando got into a monetary squabble with the producers and was ousted from the second movie although his scenes already were in the can. A lawsuit between the producers and star Chris Reeve (who was about to star in *Time After Time*) delayed production even further. Eventually, a time schedule was announced. Stars were resigned. Guy Hamilton was announced as director. Guy Hamilton was dismissed as director. Finally, Richard Lester inherited the director's chair.

At that point, veterans of the first film, screenwriters David and Leslie Newman, re-entered the fray. "It was confusing for a certain amount of time," recounts David, "but eventually

The Man of Steel (Chris Reeve) is here deprived of his super powers. Will justice triumph?



everything worked out.”

“In fact,” adds Leslie, “it turned out to be one of the best working experiences we’ve ever had.”

“For the first film,” David says, “there were two separate scripts. The idea, originally, was to shoot both movies at the same time. They ran out of money when it came time to shoot the second film, however. They only got a bit of it finished. When the producers looked at it they found most of it unacceptable. Some of it is used in the second film, though.”

“The producers then decided to make a few plot changes,” Leslie states.

“Brando had to be taken out of the second film,” David injects, “so all the scenes that had already been shot with him were no longer useable.”

“And Brando had a pivotal role in the storyline of *Superman II* so we had to find a new way to structure it,” says Leslie.

“Then,” continues David, “we got a new director, Richard Lester. We spent an entire summer two years ago brainstorming. We wound up re-writing the second script because we had new ideas. We essentially wrote part two all over again, making a lot of changes.”

In the new film, Superman inadvertently releases the three Kryptonian criminals (from the first film) from the Phantom Zone. Arriving on Earth, they find that they possess super powers and decide, what the heck, why not take over the planet. Meanwhile, Superman chooses this moment to reveal his true identity to Lois Lane. He agrees to give up his super powers in order to marry her, and, presumably, settle nearby Metropolis and buy a couple of lawn jockeys.

The extensive re-writing of the second film’s storyline led some movie rumor mongers to suspect that the movie’s producers were going out of their way to change the plot just to spike Donner’s already filmed material. Not so, say the writers.

“The second film was always designed to concern itself with the three super villains,” David states. “It was always supposed to begin with the release of the prisoners from the Phantom Zone. We found a different way to release them for the re-write, however. The original idea, way back when, called for us to end the first movie with a cliffhanger. Lex Luthor’s rocket, which Superman throws off into space during the first movie’s climax, was to shatter the Phantom Zone and let the trio free.”

“It got to be kind of a klunky plot device to use when we started the second



After rescuing a busload of passengers, Superman prepares to take on the terrible trio.

film,” Leslie explains.

“It wouldn’t have made much sense if you hadn’t seen part one,” says David. “You’d have to reprise the whole first film in the second movie for the rocket sequence to be understandable. So, we came up with an entirely new device that has to do with a nuclear weapon housed on the Eiffel Tower. Once again, it’s Superman who inadvertently causes the Zone to be shattered.”

In *Superman II*, holdover characters such as Lex Luthor and Jimmy Olsen play less important roles, leading several movie watchers to wax eloquent in print that this pruning of characters is an attempt to make the new film less humor-laden than the first. “Their absence doesn’t lessen the humor at all,” David insists.

“They’re simply not essential to the story,” Leslie stresses. “Luthor was the villain in part one. We have three other villains in part two as well as Luthor. We simply felt that we didn’t have to spend as much time with Luthor in this movie although I think you enjoy what time you do spend with him.”

“The love story is a considerable part of what the second movie is about,” David reveals. “There’s less of some of the other elements so this can be stressed. Actually, I think there’s more humor in this film than the first. There’s not all that heavy, portentous, Biblical Krypton stuff we had to deal with in part one. I think there’s a lot more humor in the Clark/Lois relationship than there was in the first. Plus, one of the three villains, the big character named Non, is funny.”

“This movie is more consistent than

the first. There were really three distinct movies in part one. There was the Krypton sequence, the Smallville-middle America sequence and the Metropolis part. It had three moods to it. In this film, half is a love story and half a super-spectacle with the three super villains battling Superman.”

“This film was a lot smoother for us,” Leslie says. “I think whenever you do the kind of film wherein you’re dealing with myth, with legend, you have to deal with the back story. When you look at *Superman I*, you find that you’re considerably into the film before he’s actually into his outfit and flying. You have an amazing amount of explaining to do. In this film we jump right into the story without having to deal with all the ‘this is how he got this way’ stuff.”

With Lester offering a guiding hand, the Newmans found that they were allowed to write with a sky’s-the-limit proviso; the sky, in this case, being budgetary and technical restrictions.

Says David Newman: “On this sort of film, you write what you think will look good on the screen and then compromise. You’ll do a special effects sequence and they’ll come back and say, ‘You have to change this because it can’t be done. You can’t break the Statue of Liberty in two. Can you fragment the Empire State Building instead?’”

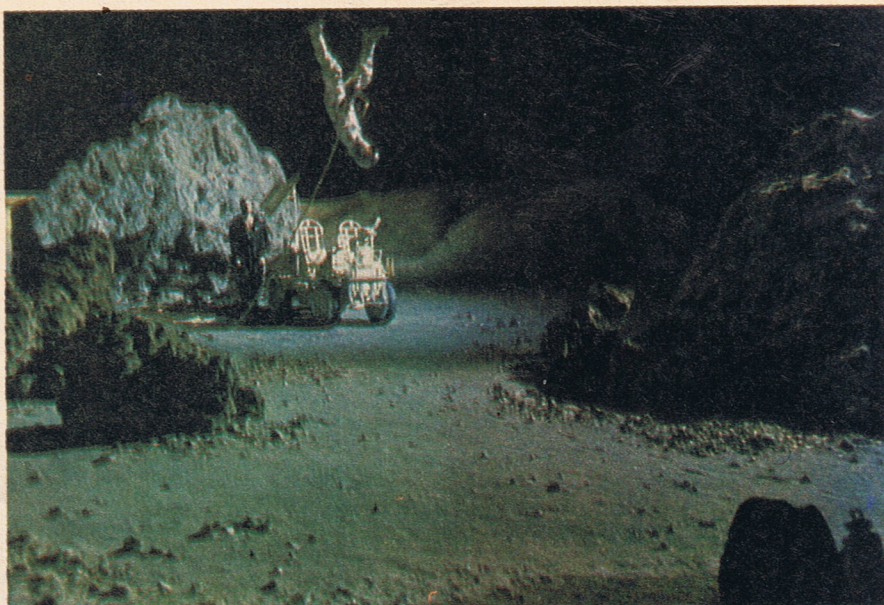
“All the way down the line, you try to think of what the maximum interesting plot twists will be,” Leslie continues. “At one point, we were considering shooting a scene on an active volcano. Someone actually went out and found a suitable volcano. Then they figured out that shooting the scene on location

would cost as much as the whole film was supposed to. At that point, we switched from a volcano to something else. You start off with the maximum and then compromise."

"But not all the compromises were because of effects or budget," David adds. "The battle of the three super villains over Metropolis wasn't too hard to film, for instance, because it was all done in a studio on the lot. When we got to the Eiffel Tower scenes, however, we ran into some snags. Part of it was to be shot at the real Tower. We had to adjust our script to the reality of what you can and can't do on the Tower. I don't consider any of this a limitation, by the way. Without pushing this to the point of pretentiousness, it's like someone saying, 'Will you write a sonnet? It has to be 16 lines and be a-b-b-a' and so on."

With a script in hand and actors reassembled, Richard Lester then began filming part two. The movie, loaded with wild effects, was more taxing on the actors than the first epic. "It was awful," moans lone female villain Sarah Douglas in mock distress. "All together, I've done 17 months filming on this movie. The first time around, it was a lot of fun. I was younger and fresher and knocked out to be working with Brando. Even that little three-minute sequence in the first film where he exiles the three of us to the Phantom Zone meant seven days of work with him. It was marvelous. That was before I learned to fly," she adds ominously.

"When it came to *Superman II*, everyone worked a lot more on the special effects. I actually did seven



A Kryptonian criminal, newly released from the Phantom Zone, toys with a hapless astronaut.

months solely of flying. That means I was up there day in and day out in front of a blue screen. Every once in a while, they'd liven things up for me and give me a line of dialogue. For an actress, that's not an ideal situation. It's also physically uncomfortable."

During the first movie, the flying was accomplished with actors suspended on harnesses in front of blue screens with background scenery to be added later. "When we came back for filming this one," Douglas continues, "we no longer used wires or harnesses. We used a mechanism called a pole-on. It's a system wherein a mold was taken of my body and that mold had a pole sticking out of the side of it. The pole was at-

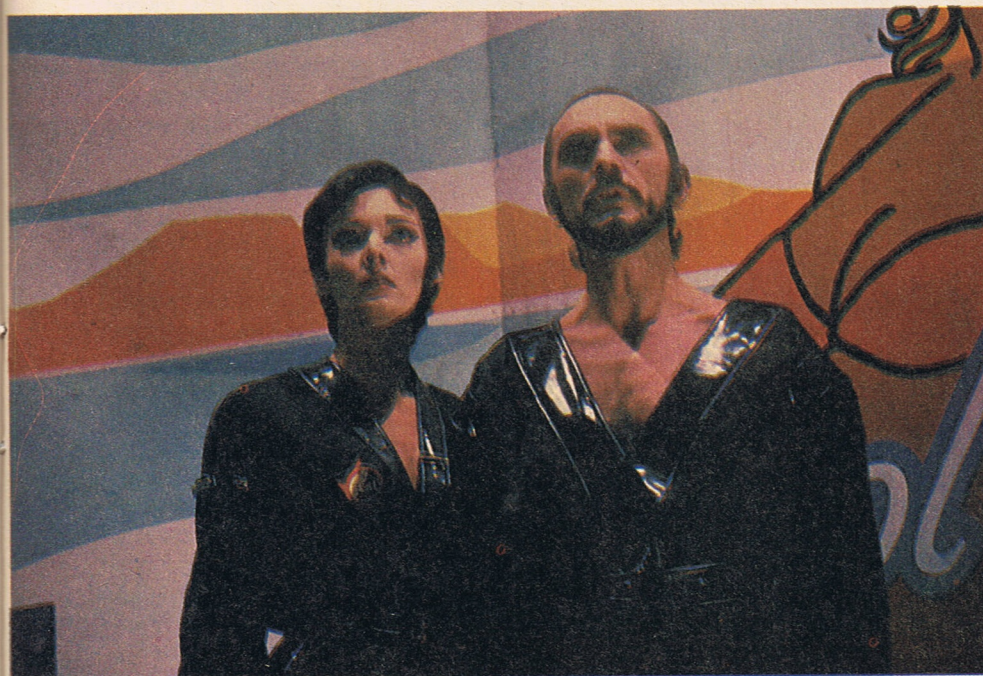
tached to a screen of blue backing about 40 feet off the ground.

"Every day I'd have to climb into this mold from a scaffold. I was then dressed over the mold so you couldn't see it at all. The camera was shooting the scenes from the side of the mold opposite the pole so my body blocked its presence out of the scene.

"It sounds like an improvement over the harness, but it wasn't. The mold only went from my knees to my armpits. So, in fact, there was more stress on the body using the mold. I was tilted on a slight angle so the camera could catch my face and the whole position was very unnatural. Because the mold was so form fitted, if you slipped a fraction of an inch, which happens when you perspire, everything got slightly out of whack. It was more uncomfortable than a harness because there was no way to get back into shape. There were certain pressure points that were unbearable. In theory, one would have been better off in a harness because you could shake your legs, arms and generally move about. In the mold, you were frozen. I started all this in August and finished in March.

"Aside from the pain, it was very lonely up there. Because of the camera angle, they couldn't shoot the three villains together. It was very difficult to block out three poles. So, for most of the time, I was up there on my own... which tends to make one crazy. That's my excuse anyhow, and I'm sticking to it."

After months of effects-laden filmmaking, the *Superman* sequel was edited and released late in 1980 in parts of Europe. Although Lester is the director of the production, some loyal Donner-



Supervillains Ursa (Sarah Douglas) and General Zod (Terence Stamp) take stock of their new home.

ists are vehemently stating that there is a lot of footage culled from the original sequel shooting. "I couldn't give you a percentage of how much of the original footage was used," comments Douglas. "When I started doing *Superman I* and *Superman II*, I worked for nine months every day. Over that nine-month period we did that small three-minute scene for *Superman I* and the rest of the time we worked on *Superman II*. Obviously, I did a considerable amount of *Superman II* four years ago. When I went back in 1979-80 to do *Superman II* again, we repeated certain scenes, reshooting them. Lester did a number of inserts for sequences that were originally filmed by Donner. It's very difficult to gauge who did what in the final film.

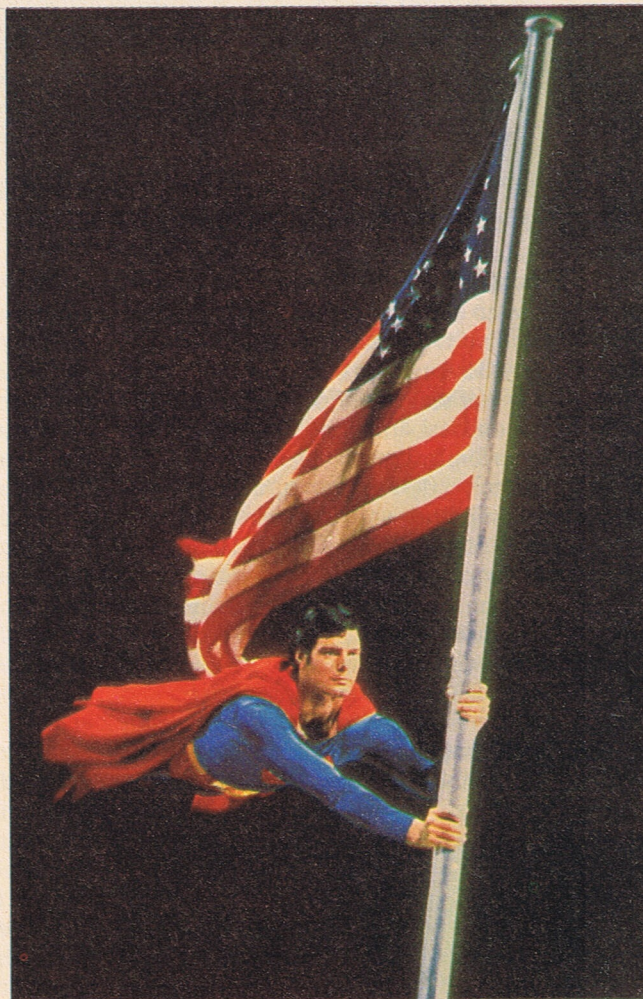
"As far as my role goes, nearly all the big sequences were done by Lester. The sequence where the super villains land on the Moon was shot by Donner. Richard Lester then re-shot sections of it. We seemed to have doubled up on the scenes quite a bit. I'm as baffled as everyone else is."

Despite its troubled history and physically exhausting production demands, *Superman II* looks to be as big as or bigger than its predecessor in terms of box office clout. "I think this film speaks very well for itself and for Lester," says David Newman. "If you know his work, you'll see his mark all over it. I don't remember ever having been this happy with a movie. We had this extraordinary experience when we saw the final film. When you write a movie, it's standard for writers when they finally view the finished production to feel, to one degree or another, let down because it's not the movie they'd written. If you get 80 percent of your ideas up there, you're doing amazingly well. When the lights came up after this film, we looked at each other in total astonishment. It was 98 percent of the screenplay we wrote!

"We're so happy, we're now negotiating to script *Superman III*. Richard Lester has signed to direct it and we want to work with him again. He's great. He allowed us to work with a larger-than-life character and make him a recognizable human being. I mean,

Superman is a very screwed up guy. One of the things that fascinated us from the beginning was the fact that here is a very schizoid personality who is involved in a romantic triangle where only two people are involved. Clark loves Lois and Lois loves Superman. It occurred to us early on that Clark doesn't like Superman very much because he's his rival. Yet, he's the same guy. All that screwed up emotion made his character fun to play around with."

"One of the reasons that the Super-



Superman still stands for truth, justice and the American way.

man myth is so popular around the world," Leslie adds, continuing in the same vein, "is that everybody feels like Superman and Clark Kent. We all walk around saying, 'I look ordinary in this outfit but if you only knew what a special person is underneath all this!' I think people will identify with Superman in this movie more along those lines."

"I'd really like to see someone refer to this film as a touching love story," David offers. "That's the one thing that might get overlooked because of the action sequences. Hollywood says about

every five years or so that what the world is dying for is a good love story. I think this is it."

"Not only because of the way we wrote it," Leslie injects, "but the way Richard shot it and Chris and Margot handled it. It made us cry the first time we saw the film."

"I'm going to say a terribly sexist thing," David announces, as Leslie warns him to "Watch it."

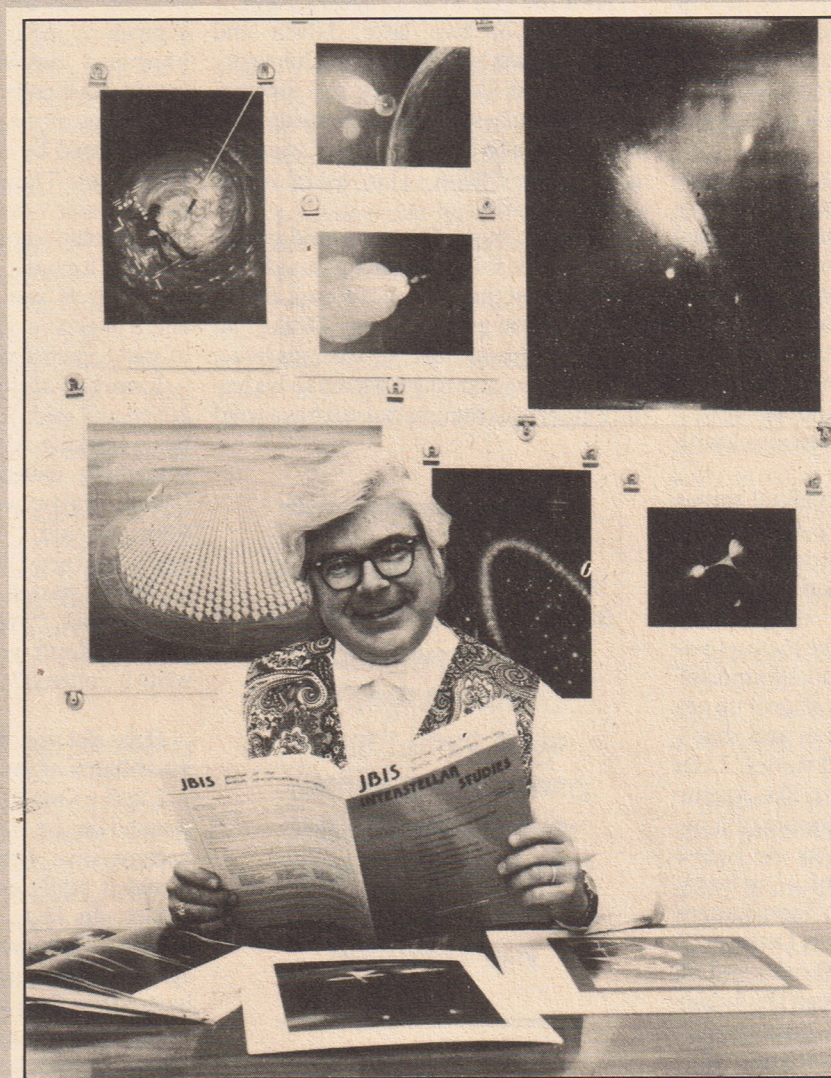
"If there are some women out there who only go to a certain kind of romantic movie that would never go to see *Superman II*. . . they're crazy. This is the movie they've been waiting for!"

Initial critical reaction to the film in Europe reflects the authors' excitement, although many die-hard fantasy and science fiction fans are ignoring the romantic elements in favor of the political and sociological ramifications as well as the film's behind-the-scenes turmoil. This approach frankly irks actress Douglas. "I'd like people to see this as a cartoon," she states.

"I've gotten a little fed up with people talking about the political side of the film and reading about who directed what and the hassles with the producers. And I'm fed up with being identified as a feminist because I happen to dispatch a lot of men in this movie. I find myself saying, 'It's wonderful! It's lovely! It's a cartoon!' It scares me that people are taking it very seriously. They're taking the super villains and Superman as some sort of metaphor for something or other. It's weird."

Metaphor. Man of Steel. Political football or just a schizo. No matter how the public sees Superman, one thing is for certain; they'll be seeing a lot more of him and soon. Despite his problems in gearing up for a take-off in *Superman II*, smooth sailing is assured for the all-American alien boy for years, and sequels, to come. "They're talking about production starting on part three next summer," Leslie Newman reveals. "That seems awfully close to us," she laughs, mulling over the workload facing the Newmans on this project. "Gee. The caped figure is going to fly into our lives again." □

Dr. Robert L. Forward



By BARBARA KRASNOFF

While the truly scientific science fiction writer has become something of a rare commodity these days, Dr. Robert L. Forward has proved that the species is not only still around, but turning out some pretty good fiction. Dr. Forward, a senior scientist at the Hughes Research Labs in California, is known for his work in the detection of gravitational radiation waves from neutron stars and black holes. (Part of that project involved running a laser beam in between two pieces of metal and detecting the differences that a passing gravity wave might make—a change smaller than the size of the atom!) However,

while Dr. Forward is well-known for his scientific prowess, science fiction readers are better acquainted with his highly popular novel *Dragon's Egg*, which deals with an emerging life form on a neutron star which has traveled near Earth.

How did you enter the field of science fiction?

One day I was reading *Analog* and there was a story by Jerry Pournelle. In it, the crewmembers are around either a black hole or a neutron star, and it emits a pulse of gravity waves which nearly wrecks the spacecraft because it's so strong. So now we have a wave that's so

strong that it tears spacecraft apart instead of dinging a little tiny bell on a detector. And I had just finished scientific calculations saying that, if Professor Weber [who worked with Forward on the radiation wave antenna] was right, and these gravity waves were moving the ends of this bar a few millionths of the size of an atom, if you got close enough to the source the wave would get stronger and stronger, and it could rip something apart if you got too close to it.

I was about to write this up as a scientific paper in some journal when Jerry Pournelle put it in his story. So I called Ben Bova, who was the editor of *Analog* at that time, and said that I'd been scooped, and can you tell me where Jerry Pournelle is? When I talked to Pournelle and told him about it, he said, "Well, can I come out and see you?" And he brought Larry Niven along with him.

I had been collecting oddball things over the years—since I've been in the field of gravity I've gotten a lot of crackpot letters—and I had collected a whole bunch of things about black holes. So I proceeded to give them a two-hour blackboard lecture on all kinds of esoteric things that hadn't shown up yet in science fiction magazines and that I thought would make good stories. I like to read hard science fiction like Arthur Clarke's—I wanted to see more of it instead of soft science fiction. So I gave them those ideas, and out of it Larry Niven got "The Hole Man" and in there he's got the "Forward Mass Detector." Then another one, "The Borderland of Sol," had a villain in it named Dr. Julian Forward, my great, great, great grandson from the planet Jinx; a scientist who had turned into a space pirate and used black holes to hijack space labs. That won a Hugo Award.

The other idea I told them about was for laser-propelled solar sails—take a sheet of mylar and push it with a laser. I had written about this in 1961 and it had never been picked up on by anybody, and they used this idea in *A Mote In God's Eye*. So I got what I wanted plus some good stories to read, and Niven got some Hugos.

When did you begin writing for science fiction magazines?

The next year, Jerry Pournelle was in charge of the program for the Nebula meetings, and he said, "Why don't you give the same talk that you gave to us?" So I gave a big talk, and Ben Bova heard about it and said, "Why don't you write it up for *Analog*?" That's when I wrote

"Far-Out Physics" and that's when I got back into writing for science fiction magazines. The next thing I knew, I was writing other articles for *Analog* and also for *Galaxy*. Then *Omni* came along...

How did you write *Dragon's Egg*?

A year or two later, Niven and Pournelle were asked by the University of Southern California to put together an evening class, a series of Saturday lectures; it was to be a mixture of scientists and science fiction. They asked me to talk on gravity.

I went to Niven's lecture, and one of the things he said was that he was always intrigued by this idea that Frank Drake had of life on a neutron star. Drake had used this idea of little, tiny beings living on a neutron star to get across to his lecture audiences that, because it has a solid

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surface, it is more like a planet than a star, even though it's quite hot; and Niven said that he'd always wanted to use that primarily because of the billion-to-one time difference.

That night, at the cocktail party they had after each lecture, I said, "I'll tell you what I'll do. I know quite a bit about neutron star physics and the extremes of gravity and things like that. Let me work out all the scientific details, and then I'll give it all to you and you get that story written."

So I went home and during the next couple of weeks I brought together all the material and found that Drake was slightly wrong. His little beings are a billion times smaller than we are, and living a billion times faster. I looked into the scientific details and found that a million to one was more like it, because the surface of a neutron star is nowhere

near as dense as the middle and that's where the creatures are going to live. So the beings, instead of being so small that you have to look at them under a microscope, are now big enough to be seen; they're about the size of a sesame seed.

The other interesting thing was that neutron stars are formed by supernova explosions and if a supernova explosion happened anywhere near Earth, it would drastically change the climate. In fact, some of the past changes may have been caused by a supernova; we don't know that. The idea would be that the neutron star would explode, and would force evolution on us, would force us to become humans. Then we would find the neutron star and would force the aliens to evolve, and the whole thing sort of tied together very nicely.

I worked all this out, and took it to Niven and said, "Here it is!" But he was busy working with Jerry Pournelle on something called *Lucifer's Hammer*. "Well, maybe we can do a collaboration," he said. "You can write the first draft and then I'll rewrite it."

Well, I started working on that, and then he said, "Well, I can't really make it. Why don't you just go ahead and write it yourself?" So he got me started.

How did you develop the cheela, the inhabitants of the neutron star?

I had so much fun with the aliens. I worked on the alien parts first, and they became alive. I really liked them, and I found it really enjoyable writing these stories. In fact, I built up the whole culture. They would have a clan-type system, somewhat like the Scots used to have a long time ago. But they were also egg-layers, so they would not have marriages. It was more as if a bunch of crocodiles became intelligent and formed groups, because they don't really know who their children are, they put their eggs in the sand...

So I developed that kind of a culture, and they didn't have mothers or fathers. I wrote lots of things to make it very clear that nobody knew whose egg was what after a few days. Then I started writing one day, and I was having a little bit of a writer's block; I couldn't write anything for about five minutes. So I just started writing, and this one character suddenly said something like, "I hope Mother likes me."

I stopped. I said, "You can't have a mother!" And then all of a sudden I realized that maybe this character really knew what he was talking about, and so I let him go on. It turned out that I ended up with a chapter in which the cheela tried to act like humans, tried to model

themselves after humans, with some disastrous consequences.

Anyway, when the characters start taking over the typewriter and insisting they're alive, even though according to the outline they're not supposed to be there, then you know you're writing.

Then I had to put in the humans, and get them in and get them out; and it's very obvious that they're very dull and I wasn't very interested in them because that's the worst part of the book.

What was the hardest thing about writing *Dragon's Egg*?

Well, when I decided to start writing a novel, I knew that I wasn't very good at writing fiction. Even now, my first drafts are full of jargon, the people are pretty stilted and I have to go back. When I edited *Dragon's Egg*, I went through about the fourth edit in order to get rid of the training that I had built up as a scientist.

As a scientist, you always use the correct word. You could be using the same word five times in the same sentence, but you do not use something that's almost equivalent; you must use the correct word. That's one of the tendencies I have to get away from.

Do you find it difficult to simplify concepts for the layperson?

No, I've done that for ages. That is my strong point. I write mostly science speculation or science fact articles. I can explain things to my mother, who's a kindergarten teacher; and in fact, when I write a science article, I'm explaining it to my mother. I've even found myself explaining how lasers work to a kindergarten kid and not doing badly.

So it's easy for me and I like to do it. I'm a first-rate teacher and I think I would have made a really decent professor, but I've never found myself on that route. I've always been with the industrial side of things, primarily because I'm a scientific inventor or tinkerer. I invent things—that's why Hughes keeps me around.

Have you invented many things?

I've had 15 or 20 patents and about 150 disclosures. The way you do things at Hughes, if you get an idea you write it down in what's called a disclosure and get it witnessed. Then, if it can actually be made, and it's going to make money, they'll go to the expense of patenting it and meanwhile you have the protection of the disclosure.

If I had been born 50 years ago, I would have been another Edison or something like that. The trouble is,

nobody can be an inventor anymore, because things are too difficult. You can't invent microcircuits; you have to have the science to do that. I've done a little bit of that kind of intuitive inventing, but because I'm a scientist and know the technology, I can do it at a higher level.

Are you working on a new novel?

Well, my next novel is called *Roche World*. It's named after E.W. Roche, a professor who died in the 1800s. The basic setting is the same as Charles Sheffield's *Summertide*. Now, he and I have the same kind of background and we invent the same things.

So we both independently thought up a story about two worlds, about the size of Titan, that are so close to each other that they are distorted into egg-shapes. One of them fills up the sky, or

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practically fills up the sky, in terms of the other one. And yet they're not touching; they're floating around each other with a few hundred kilometers between them.

I'm going to put water on one of them, a pretty thick kind of water, so it will be like Ganymede and Titan whirling around each other. Only now, because of all the tidal friction of these liquids, you have an ocean that has 60-degree slopes and it doesn't fall down. And as you swim up the ocean, you come more and more out of the water because the gravity becomes less and it's almost zero at the top. (Actually, there's zero gravity between the two planets, but they aren't quite that close yet so the water mountain is underneath the zero gravity point.) They share a common atmosphere, so you can get into an airplane and fly from one to the other—interplanetary travel is done very

quickly. I won't go into detail because I don't want to spoil the story.

I imagine that the scientific parts of your books are very carefully done.

I try to get all my science correct, and when I have a first draft, before I send it off to the publishers, I send it out to my scientific friends and they find flaws in it. In this case, this *Roche World* outline has been sent out to a number of my scientific friends and one of them happens to be a graduate student at M.I.T. Between semesters at M.I.T., during the month of January, they allow the students and professors to hold their own courses; they call it Independent Activity Programs. So every Monday and Thursday this class is meeting to design *Roche World*. The name of the class is called "Designing a World, or the Sky is Falling—Really!" and they're up there, trying to go into details—exactly at what level will the gravity get weaker, what are the night and day cycles, things like that. So they're having this class, and I'm getting some help in designing this world.

Will there be aliens?

Yes, there will be aliens there. And again, I won't go into it right now; they're still to be designed.

What is your opinion of the U.S. space program?

I wish it were better. I think the program has been under fire so long and also has been stuck with the burden, basically, of building the shuttle. I'd have really hoped we'd have been further along. We should have gone right back to the Moon, with the orbiter at least.

I really don't know what to do about it. I feel the way I can best contribute is to get the ordinary person interested in science and technology and space; enough so that they are intrigued and think it's a worthwhile thing to do. Because I have this ability to explain terminology, that's the way I feel I can contribute the most. That's why I'm doing a lot of those science articles, to try to solve the space problem. There are other people who are organizers. I've been asked to be part of the L-5 Society and I'm always turning these people down because I feel I can contribute better by writing my articles, getting the ordinary layperson more educated in science.

The world is becoming more complex, and the average person is going to have to realize that they can't avoid thinking about science and technology; that they have to pay attention to it. ▮

My Old Flame

After the January 27, 1967 Apollo fire that killed Virgil Grissom, Edward White and Roger Chaffee on the launch pad, NASA eliminated the use of almost all flammable materials in astronauts' living quarters. Safety is great, but have you ever tried to dry your face with a totally nonflammable fiberglass towel? The poor Skylab astronauts spent months wearing fiberglass suits, underwear... an in-depth perusal of the details of Skylab's waste-disposal system failed to enlighten me as to whether fire safety included fiberglass toilet paper. But it's clear that the Skylab solution to fire hazards was plenty uncomfortable.

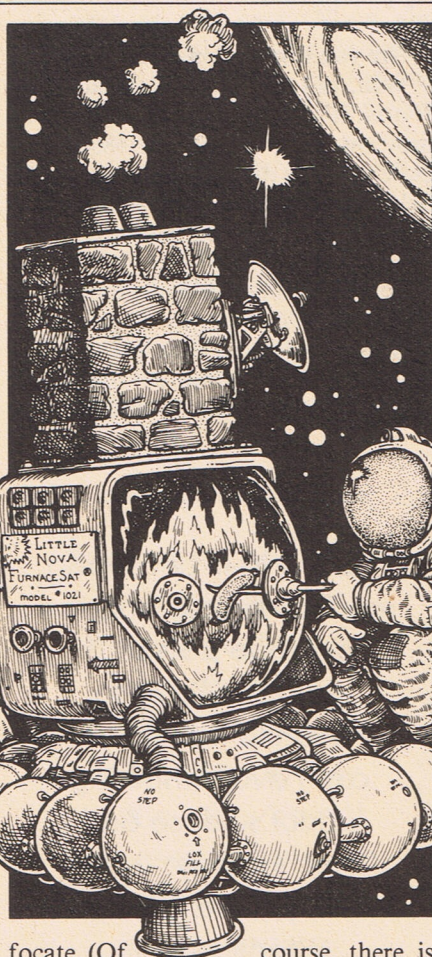
I happen to be vain and self-indulgent. When I move into space I want to be able to pat myself down after a shower with a fluffy towel. I want to wear slinky clothes that will entice my husband, Keith, to cuddle me when I brush by him. Fiberglass doesn't fill the bill.

There aren't any decent nonflammable alternatives—just asbestos and other equally scratchy silica-based fibers.

But lovers of fuzzy, cuddly surfaces need not despair. Fires are a hazard on the launch pad, but not in zero g. Once they reached orbit, the Skylab astronauts would have had one heck of a time setting a bonfire with those cotton towels and jockey shorts Earthsiders prefer. The reason is that in zero g any fire which requires oxygen to keep burning will, unless air is constantly blown on it, snuff itself out.

Why? You've noticed the updraft over a candle. The heat of a flame causes the air in and around it to expand. In any significant gravity this expanded, and as a result less dense air is squeezed upward by the cold, heavier air around it. New air with unburned oxygen flows into the flame to replace the old air whose oxygen has been converted to carbon dioxide and water. However, if you stop this air circulation by covering the flame with a jar, even if there is a space underneath to let air in, the circulation is stopped. The flame exhausts the oxygen around it and dies.

In zero g we have the same situation as the candle with a jar over it: Fires suf-



focate. (Of course, there is a certain amount of air circulation in a space capsule—for simple breathing purposes, if nothing else. However, the circulation would not be sufficient to maintain a reasonable flame.) So, while fire regulations might require future space travelers to suit up in fiberglass for the launch pad, once we get into orbit there should be no excuse to keep us away from our favored fabrics. (The Skylab astronauts, by the way, pointed this out to Mission Control, but NASA never got around to shipping them any Fruit of the Loom.)

How will smokers handle zero g? For one thing, they won't have the option of just stepping outside the space station if someone complains of the fumes.

There are several ways to keep your cigarette, pipe, hookah or whatever alight. First, you could wave it around constantly. However, an orbiting cocktail party full of people windmilling around their smokes could intimidate those who are allergic to cigarette burns.

Second, you could smoke hippie style. Take a deep toke and pass it quickly to the guy on your right. As long as you keep drawing air through the burning plant matter you're okay. Third, you can attach a little battery-powered fan to your pipe or cigarette holder. Just watch out that no one's hair gets near the blades, especially your own. Fourth, you can impregnate your smoking material with potassium nitrate or some other high-grade oxidant. Heck, that kind of cigarette will burn like dynamite fuse even in a vacuum! The cigar smoker who is booted outside with his stogie could still smoke it down to a nubbin without interruption.

How about fireplaces? President Nixon was so enamored of a crackling fire that he used to turn up the air-conditioning full blast in the peak of summer so he could burn a few logs on the White House hearth. Fireplaces turn us Hensons on, too. When Keith and I were courting in the winter of '67 (that dates us!), his romantic intentions were somewhat hampered by the lack of a fireplace in his apartment. We eventually managed to make do by cuddling in front of the gas wall heater and using our imaginations a lot.

Will orbiting love birds and free-falling troubled Presidents also be forced to rely on their imaginations? Fan-driven fireplaces could come to the rescue.

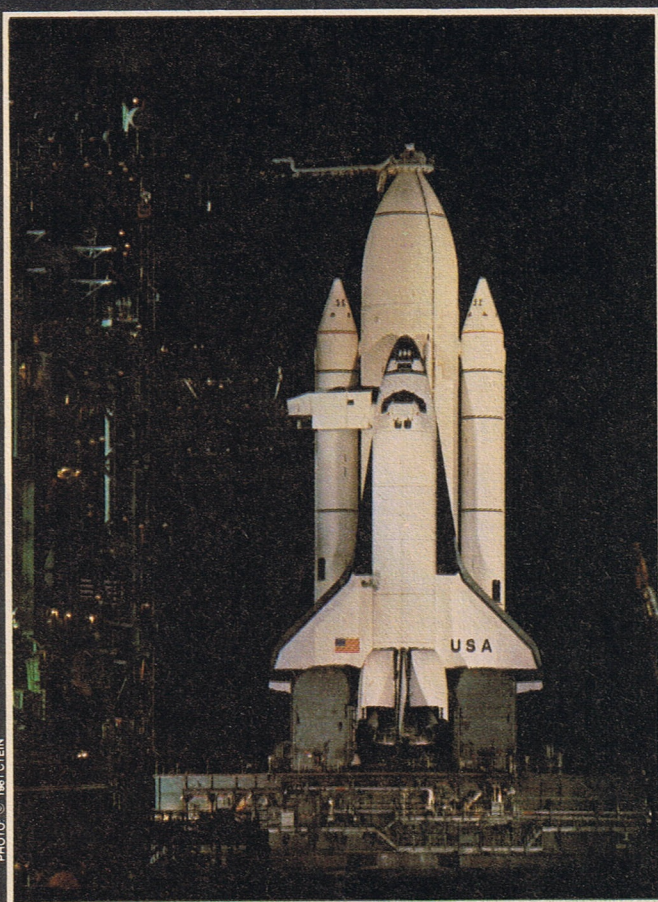
I'd be tempted to run a magnesium turnings fireplace in my free-fall bungalow. First, there would be no need for fans. Magnesium burns air, both the oxygen and nitrogen, into a powder, rather than converting it to suffocating carbon dioxide and water vapor, as happens to plant matter-based fires. Magnesium flaming merrily on the hearth brings back nostalgic memories. Three generations of my family have been lathe and milling machine devotees. The dads have always brought their magnesium turnings to the hearth to warm the wife and kids. True, that metal burns with a blinding ultraviolet glare, but any normal home should have plenty of welding goggles to go around as they gather for cocoa and a bedtime chat around the fireplace, right? [E]

CTEIN

He calls himself simply Ctein, and offers no clues as to his actual identity or how his unique name came to be. "I got tired of telling the story about a year ago. Maybe next year I won't be."

Whatever he calls himself, the man is a photographer of the highest caliber, as witnessed by the breathtaking photos he took for *FUTURE LIFE* of the *Columbia*'s launch and landing. Surprisingly, he has no formal training as a photographer, though he does hold a double degree, in English and Physics, from Caltech. Adding to his self-taught expertise, Ctein does all his own film processing and color printing. In fact, he's recently been asked by Kodak to write an instruction manual on die-transfer color printing, one of his specialties.

"I can't remember when I wasn't interested in the space program. I thought I'd be an astronaut when I grew up, un-



til I realized that you had to be a jock. And if there's anything I wasn't," admits the slim photographer, "it was a jock." It seems though, that his airborne interests came early in life. "My first memories ever are of being in an airplane. I think I'm basically flight-oriented."

However, the trip from his home in California to the

blast-off at Kennedy Space Center—and back again to document the landing—was anything but flight-oriented. He and two friends/co-workers, Terry Garey and Doug Faunt, drove the 6,000-plus miles. Herein lies the tale of their amazing odyssey.

"We figured there were 54½ hours from launch to

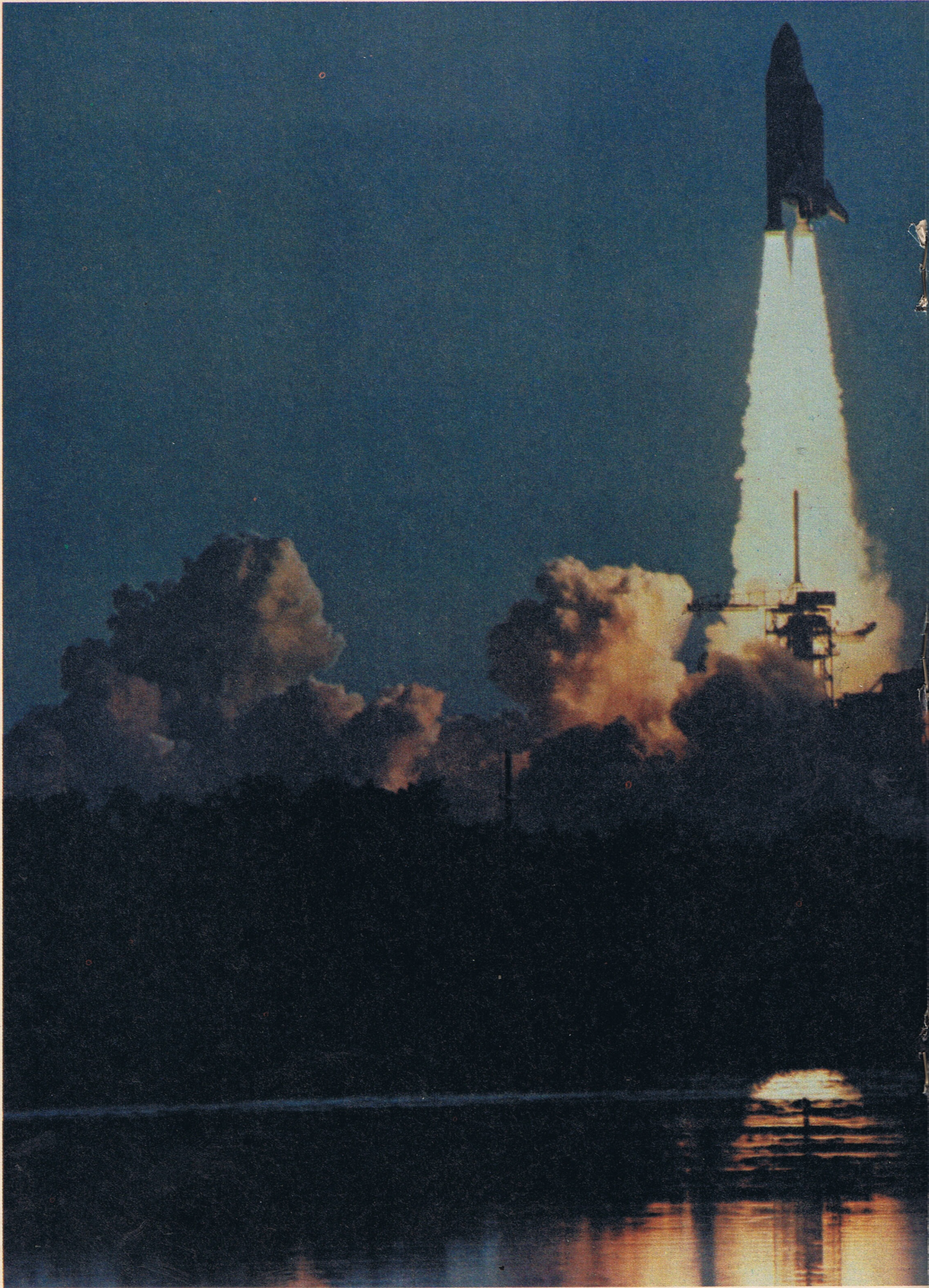
landing," Ctein recalls. Allowing for traffic at both the launch and landing sites, they had about 51 hours for the approximately 2,500-mile drive.

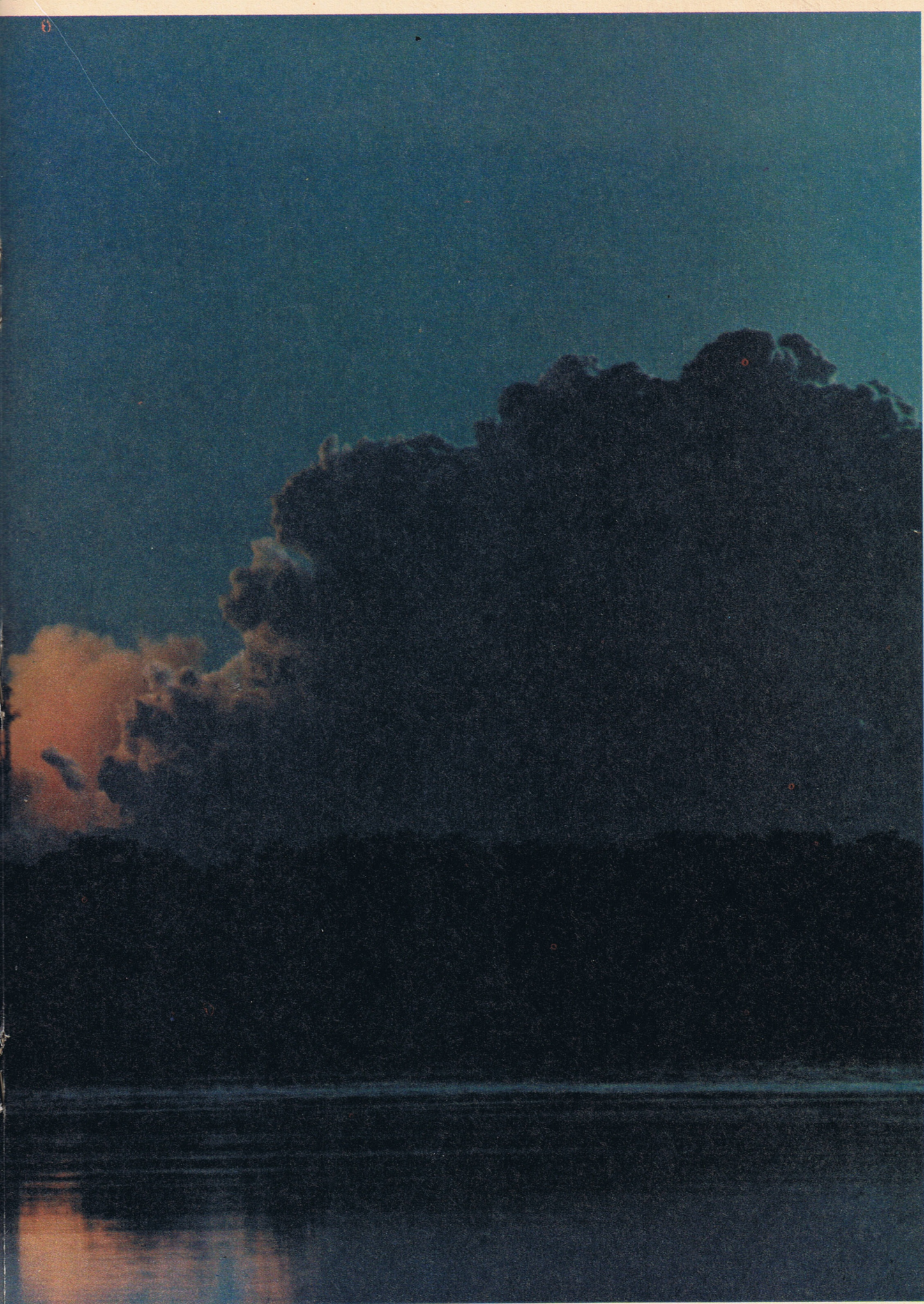
At an average of 50 miles per hour, Ctein figured, "it would be possible to do the trip without having to average faster than the legal speed limit; we won't talk about the peaks and valleys. . . ."

"By the time we hit Texas, we'd actually picked up three hours. Then we lost all our valves. In Fort Stockton, Texas, we stopped and did a valve job. In all, we ended up losing about eight hours." Back on the road again, "we floored it, all the way from Texas to California, until we got to Palm Springs where we finally got pulled over.

"We got ourselves positioned 15 minutes before the shuttle came over and we got the pictures you saw. I'm impressed as hell that we did it."







AN EDGE IN MY VOICE

personae of the David Berkowitzes, Mark David Chapmans, Charlie Mansons and John Hinkleys who wander stunned and ready to explode through the feartime night.

This resurgence of widespread lunatic behavior is not, I am convinced, a thing apart from the rise of the Moral Majority. I think it is a manifestation of the same disease in the body politic that has caused the fundamentalists and all their clone-children to assume such prominence on the national scene.

It is not simply coincidence that Berkowitz (Son of Sam) listened to the voice of God who told him to kill; that Chapman had been involved with cults and was a brainwashee of the Jesus Movement; that Charlie Manson was brought up deeply and rigidly religious, and that he sought a new religion in the overlay of mysticism '60s layabouts perceived in Heinlein's *Stranger in a Strange Land* with its Christ-surrogate, Valentine Michael Smith; that Hinkley is a longtime reader of science fiction and adventure fantasy. Look at photos of Berkowitz, Chapman and Hinkley. Lay them side-by-side and look at the somatotype similarity. They look as if their moonstruck faces had been cut by the same cookie stamper.

In my endeavor to confront the maleficence of the Moral Majority—its book burnings, its attempts at legislating morality, its Dark Ages sensibility toward science, its Spanish Inquisition vengefulness—I have begun to sense a linkage between mind-dribble fantasy of the sort typified by films like *Excalibur* and the recent NBC effluvium *Fugitive from the Empire*, and the comeback of born-again fundamentalism in this country. I'll go further: I perceive the linkages between mind-dribble fantasy (I'll define that at greater length perhaps in the next installment) (for the nonce, you can assume I mean that subgenre of fantasy dealing with chattering bunnies, furry-footed denizens of deep forests, dragons, lion-maned barbarian warriors, runic quests in search of the lost scepter or the mystic bloodstone, nerds who say *thee* and *thou* a lot, and call their enemies *varlet*. . . you know what I mean: the kind of books that have unpronounceable words in the title and pastel vistas painted on the covers) and dat ole-time religion currently masquerading as a socio-political revival of

ethic as only part of the chain that includes berserker assassins in love with Jodie Foster or Jessica Savitch; the proliferation of nauseating knife-kill flicks in which women are endlessly raped, brutalized, carved up and rendered non-threatening to males who cannot cope with a world in which women are their equals, even in *some* things; the insensate rise in anti-Semitism, pseudo-Naziism, the KKK (with military training camps in 27 states) and a hundred different cults—each with its own bush-league messiah—dedicated to keeping its drone members dumb and penniless; and the paranoid need of NRA "sportsmen" to convince themselves that a nigger is just about to break into their home and rape their cellulite-riddled wife.

It is my sure conviction that all of this is linked.

"I have begun to sense a linkage between mind-dribble fantasy of the sort typified by films like *Excalibur*, and the comeback of born-again fundamentalism in this country."

And so last issue I ran a series of letters between a paleontologist named George Olshevsky, and some creationists. I turned over my column to Olshevsky, whom I see as a courageous man, because he had gone as far as he could go. He had put himself on the line against the cabal, and the medium in which the fray was fought, a San Diego newspaper, chose not to serve the ends of rationality and exhaustive discussion; but merely the commercial end of "let's you two fight" until they felt the audience was growing bored. So Olshevsky, frustrated, wrote me (definitely the court of last resort) and asked if he should keep at it. I responded by giving him a much larger forum than formerly.

And I said, last column, that I'd come back this time to make a few parting



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As I write this—weeks late and my sanity maintained largely through the forbearance of my editor, Bob Woods—the mail has not begun arriving in response to last issue's opening encounter with the Moral Majority, the New Right, the Forces of Reactionary Censorship. . . call them what you will. I expect the usual apoplectic screeds. And they will, no doubt, be of a piece with the several hundred letters that came in to *Heavy Metal* magazine recently, hard on the heels of an editorial I was pressed into writing on the subject of gun control. The editorial was sparked by the death of John Lennon, but it was foursquarely concerned with the inarticulate conspiracy of which we are all a part. . . when we don't break our asses to get gun control passed in this ever-more-deranged nation.

Even for those few of you who actually still believe civilians ought to be permitted to own guns, a reading of my mail after the appearance of the editorial would serve, I feel sure, to convince you that we *must* have total gun control as quickly as possible. The letters are ennobled by the word "sick." The realization that there are people out among us who are even capable of *writing* such deranged foulness could not but serve to sway you inexorably to a belief that madness is not manifested solely in the

remarks on the subject. The preceding have been those remarks, buttressed by these:

After the Lennon gun-control essay, I received the kind of mail I expect to get from last issue's refutation of the idiocy of creationism. One of the letters was on embossed Nazi swastika stationery. It was from a man in the U.S. Navy, at the Groton, Connecticut, submarine base. I hope he was trying to be funny, using that stationery.

Uh-huh. That's my hope.

But if I get another one from him like that, I think I'll send it on to the Base Commander, who may have been in WWII and who may remember what that crippled cross stands for. Because it seems to me that in these days of trembling crystal, with the glass singing its song of impending shatterment, and lizard men in three-piece ice cream suits promising us salvation in the life of a sheep, there are very few realities whose unarguable truth are not up for grabs. And one of the most firmly secured is that 20 million civilian victims of Nazi brutality, 20 million homeless ghosts, whisper to us night and day that we must ever be on guard against a return of that hurricane insanity that challenged god and man and sanity. For smartass punks who think it's rebellious or hip to make use of the swastika, history is waiting to snatch you away and give you over to the sleepless ghosts.

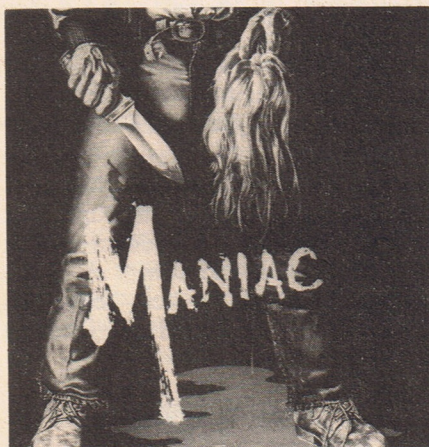
* * *

I need a break.

So this section of the current installment will be given over to making a buck. Pure self-serving, calculated commercial enticement (of an interesting sort); but if I can't apprise you, my readers, of this... then who the hell *can* I buttonhole?

But...

Like the charming little pack rat that leaves something behind when it steals some bright object, I will give you a dream in exchange for your time and attention. (Actually, this "trade" accredited to pack, or wood, rats is more a matter of Disneyesque anthropomorphism than zoological fact. There is good in the most evil of us, and contrariwise, what seems to be ethic may be only circumstance. To wit: the little fellers can only carry one thing at a time; so if it sees some nifty object near your



Do knife-kill flicks foster paranoia?

campfire, and it lusts for it, then it drops what it was carrying. Thus was promulgated the legend of the equitable behavior of pack rats, based almost entirely on a pack rat having carried off a vial of botulism, leaving behind the Koh-i-nor diamond, which was later presented to Queen Elisabeth after the annexation of the Punjab.)

The dream is this: a dream of mine, but I'll share it.

It was the late '40s. See now this kid, Harlan, 13 or 14 years old, riding in the back seat of his mom and dad's green Plymouth, on a Sunday late afternoon. In those days the family "went for a ride." Nowhere special, just out for a leisurely spin to buy an ice cream cone, to drive into Mentor, Ohio, where a certain ice cream parlor carried comic books the kid couldn't get in Painesville. See them, the three of them, Mom and Dad and the kid, driving along a country road in Ohio... listening to the radio.

In those days wonders came across the airwaves. I've written about those wonders in "Jeffy Is Five." Adventure with Jack Armstrong and Capt. Midnight and Terry & the Pirates. Comedy with Jack Benny and Easy Aces and Eddie Cantor. Drama with Orson Welles's Mercury Theater, Lux Presents Hollywood and the Molle Mystery Theater where I first heard Robert Bloch's name, and his terrifying story "Yours Truly, Jack the Ripper" that led, years later, to my writing my own Jack the Ripper story, "The Prowler in the City at the Edge of the World."

Wonders that taught me how to think visually.

If it had not been for listening to radio

drama, I would never have been able to write motion pictures; and the stories I've written would not be quite so clearly viewable on the screen of your mind. Imagination is served wonderfully by sound. One can create in the theater of thoughts sets and artifacts that it would cost Hollywood billions to actualize. And I was a child of radio dreams.

See then: this kid Harlan and Mom and Dad, driving down Mentor Avenue, on a Sunday afternoon early in the '40s. And the radio spoke:

"Quiet, please." A pause, heavy with expectation. Then, again, "Quiet, please."

The voice of Ernest Chappell. One of the great radio voices. A sound that combined urbanity with storytelling wisdom. And the show was on the Mutual Network; it was, of course, the legendary *Quiet, Please*, created by Wyllis Cooper.

I begged my mother and father to leave it on, not to change over to one of the most popular Sunday comedy shows; and they left the dial where it was, and I heard something that I have never forgotten, something I will share with you now.

Ernest Chappell narrated Wyllis Cooper's scripts. The programs were backed up by sound effects and music (the theme was the second movement of Franck's *Symphony in D Minor*, a work I cannot listen to, even today, without being thrilled to my toenails), but essentially it was Chappell, just speaking softly. Quietly. Terrifyingly.

What I heard that Sunday afternoon, so long ago, that has never left my thoughts for even one week, through all these years, was this:

"There is a place just five miles from where you now stand that no human eye has ever seen. It is... five miles *down*!"

When I heard that, and even now when I say it at college lectures, even when I simply type it on a page, a chill takes possession of my spine.

And the story was wonderful. (I'm sure if I were to hear it now, 40 years later, it might be woefully thin and unworthy of the weight I have put on it... but I've managed to obtain recordings of the five or six shows that are still extant, and they are superb... so memory, this once, probably serves me well.)

It concerned a group of men working

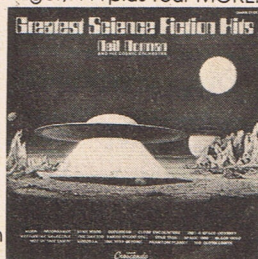
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in the deepest coal mine in the world. (Coal mine? It's been 40 years; it may have been a tin mine, or a diamond mine.) And they break through the floor of the mine and it turns out to be the ceiling, the roof, of the biggest cave in the world. I mean *big*! So gigantic that even the most powerful searchlights can't penetrate the darkness through that hole. Nothing can be seen down there. It just goes down and down. A stone, dropped through the hole keeps falling... there is no sound of its having landed.



Logo for the record club.

So they rig up something like a bathysphere, and a couple of guys are lowered in it and... they're attacked by pterodactyls before they can reach the bottom!

Now that's all I remember of the plot; but tell me something, troops: how many stories you heard or saw or read 15 years ago, ten years ago, even *five* years ago... do you remember that clearly today? And I heard "Five Miles Down" at least 40 years ago. And it's still with me.

Still with me to the extent that very soon now I will be writing a story titled "Down Deep," which will open with Wyllis Cooper's basic idea, and go from there. Still with me to the extent that I have always loved the sound of dramatic readings and have learned my lessons well from Orson Welles and Wyllis Cooper and Ernest Chappell.

Which brings me to the commercial aspect of this part of the column. My public readings started drawing some small attention a number of years ago; and I was approached to put some stories on record. I did so. They sold out. Now, because I love reading my stories, and I cannot be in every Middlesex

village and farm where someone might like to hear me read a story, I have initiated The Harlan Ellison Record Collection.

This will be real nifty, gang. It is a sorta kinda record club that will publish a regular *Newsletter* with information about my college appearances, upcoming publication of new stories, ongoing reports of the progress of my film work—even the unlikely possibility that *I Robot* might get made at last—and pieces of unpublished works, inside stuff... be the first on your block to be bored silly!

But the best part, the really snazzy part, is that you will have a chance to buy records as we release them, in signed and numbered editions, at prices lower than the *few* specialty bookstores we'll be using as outlets will be selling them for. The first record is already available, a reissue of the album *Harlan! Ellison Reads Ellison*. This record includes complete versions of "Repent, Harlequin!" Said the Ticktockman" and "Shatterday." The first edition of this record, long unavailable, is selling through antiquarian book dealers for fifty bucks a shot.

The way to join the Collection is simple. Five bucks gets you a membership and the *Newsletter*. Send the five dollars in check or money order to: The Harlan Ellison Record Collection, 420 South Beverly Drive, Suite 207, Beverly Hills, California 90212. If you want a copy of the *Harlan!* record, include an additional \$7.95

And yes, this is a commercial venture, and I don't want to lead you astray by trying to infer that someone else is behind this Collection. It's my money backing it, and I stand behind every record.

But the dream I'll be sharing with those of you who enjoy my work is the dream I got that Sunday afternoon in Mentor, Ohio, when I heard Ernest Chappell say... *five miles down!*

* * *

And next time I'll finish off the current screed against the Moral Majority, and get into the subject of knife-kill movies.

Till that time.



EDITOR'S NOTE: Mr. Ellison has been given a free hand to express his opinions. If you don't like what he says, it's not our fault. If you really love his column, we'll take full responsibility. Publishing is funny like that. The content is copyrighted © 1981 by The Kilimanjaro Corporation.

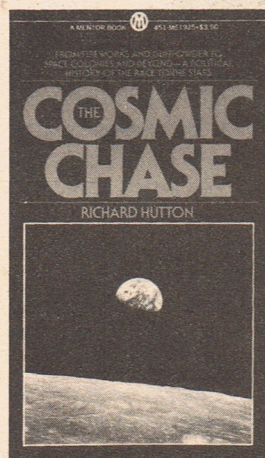
Look! Up in the Skies...

Space Race

On April 12, 1961, a Russian cosmonaut by the name of Yuri Gagarin became the first human to exit planet Earth straight up. His departure—and more significantly, his safe return to his native soil—marked humankind's first tentative step into the adventure of space. Now, exactly 20 years later, the successful launch of space shuttle *Columbia* marks the race's first step into the business of space—or so the experts tell us when they're not touting the military uses of the great beyond.

Well, this would seem the ideal time to sum up the results of the human space program, taking all possible advantage of the benefits of hindsight, reflection and disgruntled bureaucrats—and authors James Oberg and Richard Hutton have done just that.

In *The Cosmic Chase* (\$3.50 in paperback from Mentor), Richard Hutton chronicles the panics, politics and guilty



pleasures of the American space program. In this somewhat jaundiced look at the "race" to the Moon and beyond, one discovers what seems like a million missteps taken by politicians and scientists.

Starting with Goddard and the German dreamers, Hutton quicksteps us through World War II and the dream turning deadly, jumping to the point where Werner von Braun decided to "stand with the victors this time," and brought his rocket team over as America's best war souvenir.

Then, in October, 1957, Sputnik circled the globe bleating its orbital rasp-ber-ry and the scientists and politicians seemed to start working more with their glands than their brains. America panicked. The public thought they were in danger and nothing would console them

but the idea of their own brave boys up there ready to put the dread Russkies in their place.

At first, NASA (then newly created) seemed to have things under control. Well-laid plans were drawn up; plans for a logical, rational exploration of space with manned and unmanned missions gradually moving farther and farther out. It was expensive and like many rational, logical plans it sounded boring. NASA got no money. So they gave the politicians and the public what they wanted—a race. And when NASA started talking space race—us against them godless reds—money poured in, but only for the race.

This, says Mr. Hutton, was the beginning of NASA's real problems. Once NASA started on their divine mission—the race to the Moon—they were headed for disaster because, after all, who wanted them once they were finished?

This is the story of pride going before a fall, told a number of times in a number of ways. Hutton has put almost all of the space program's warts between covers, and the picture that emerges is one of a techno-schizo organization. On the one hand, NASA managed to move American industry ahead of everyone else in the world in electronics, management, bio-science and a dozen other fields, while at the same time so completely losing touch with the public and the politicians who controlled the agency's pursestrings that it almost managed to destroy itself. This is an excellent piece of scholarship with only a few irritating lapses into a rather catty naivete about political realities. It constitutes an important, if unpleasant, history of space exploration.

Seeing Red

Oberg has put together a comprehensive history of the Russian space program in *Red Star In Orbit* (\$12.95 in hardcover from Random House) and suddenly it seems that the space race was never a race at all.

Now Mr. Oberg isn't an inspiring writer, but he has managed to put together his story against incredible odds and it is a terrific tale. His tools are information deduced from disinformation, crews figured out from altered photos,

missions followed and eavesdropped upon by amateur radio listeners, an astronaut's diary and a great many sources that for one reason or another cannot be named. His results are compelling.

The Russkies got the jump on us in the space race, lifting the first and the biggest payloads into orbit. Then they got the first man in orbit. Panic ensued in the good ol' U.S. of A. But their lead was illusory. All they had was a big dumb rocket that could get a lot of weight off the ground. Their list of "firsts" also included the first pad disaster (a rocket blowing up on the ground), the first astronaut dying on a mission (evidently his chute got tangled) and a pair of astronauts so thoroughly off-target that they spent a night in the woods with starving wolves scratching on the door of the capsule while they waited to be rescued.

Oberg has put together a story that you haven't heard before and it's well worth your time and money. And amid the furor surrounding the shuttle liftoff, we would do well to remember that despite their early setbacks, the Russians have continued their manned space program to the point that nowadays they hold all the records except for time spent driving golf balls on the Moon. Even without the world's most sophisticated technology, Russian space stations have been manned almost continuously for a very, very long time now.

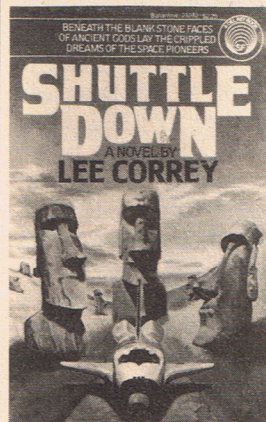
Shuttle Shambles

Now that Messers Oberg and Hutton have given you a look at the human space program's past history, Lee Correy (A.K.A. G. Harry Stine and "The Old Rocketeer") offers a peek into the space shuttle's near future possibilities in *Shuttle Down* (\$2.25 in paperback from Ballantine).

Here we have the first shuttle disaster story. A premature main engine cutoff leaves pilot Frank King only one possible landing site—Easter Island, home of the great stone faces and just about the most isolated airstrip on planet Earth. And once they're landed safely, Colonel King and the crew of the STS *Atlantis* discover that the complica-

tions have only just begun.

Shuttle Down is a procedural novel. It uses an action-packed plot-conspiracy, sex and love all show their pointed little heads—to explicate the whys, hows and wherefores of dealing with a complex space emergency. And, since this is G. Harry Stine—rocket engineer, historian and all-round expert—writing, we can be sure that all the proper homework has been done and such an emergency would (in the best of times)



proceed just as we've been told.

This story shows the U.S. space program so close to making space travel an everyday affair that if they can cope with this emergency

they'll know that they can cope with anything. Of course they do cope and we are all heartened at story's end. On the character/love interest/thrilling adventure side of the story, Mr. Correy/Stine is a little too predictable, but that's okay since we all just dropped in for a space shuttle pep talk anyway.

Far-Out Futures

If you're tired of 20th-century space exploration and its timid first steps into the universe, Nigel Calder's *Spaceships of the Mind* (\$6.95 in trade paperback from Penguin) is just what you're looking for.

Mr. Calder has collected the most exciting designers' dreams in his colorful collection; and in this little world, the space shuttle is only a beginner's toy.

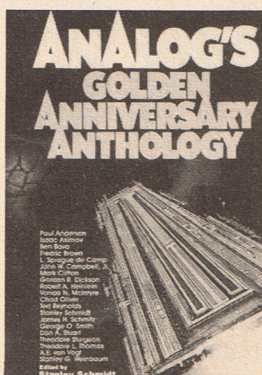
This is the book of the *big idea*. Here, Freeman Dyson holds forth on bouncing across the galaxy on a stream of atom bombs; you get yet another introduction to Gerry O'Neill and the asteroid miners; some folks who have an idea for feeding the hungry

multitudes say maybe they can feed those of us who move off the planet and into space colonies; you learn how to put together an interstellar expedition fueled by helium-3 from Jupiter and a whole lot more.

This was put together for a BBC television show, and the show was probably fascinating. The book isn't quite that, but is an interesting look at the idea of the big idea—projects of such tremendous scope that they can make you see new possibilities, dream new dreams.

Astounding Stories

In January, 1930, *Astounding Stories of Super-Science* hit the stands. Very shortly, it became *Astounding Science Fiction*, and *Astounding* quickly be-



came the undisputed leader in the field of science fiction. Under the sure handed editorial guidance of John W. Campbell, SF's Maxwell Perkins (don't laugh), *As-*

tounding evolved a style based on action, strong storylines and real science stretched to the limits of the writers' imaginations.

After a half-century, *Analog Science Fiction/Science Fact* (only the magazine's name has changed) continues to thrive on the same style—a record that none of the other SF mags can match. *Analog's Golden Anniversary Collection* celebrates 50 years in print with a generous helping of yesteryear. Editor Stanley Schmidt has included stories from every era: Don Stuart's "Twilight" from the '30s; Weinbaum's "The Lotus Eaters" from the same era; a John Campbell story to show that he did exist before he was an editor; Heinlein, van Vogt, Fredric Brown and Theodore Sturgeon from the '40s; Anderson and Schmitz from the '50s; and a representative selection from the '60s and '70s that includes Mr. Schmidt (*Analog's* present editor) and Mr. Bova (*Analog's* last editor), Ted Reynolds and Vonda McIntyre.

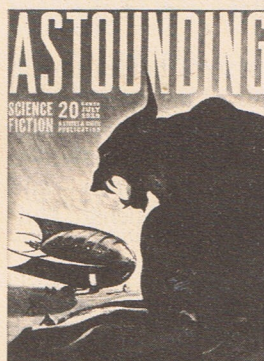
This collection could have been much more exciting, though, if the editor had gone for less well-known stories. Some

of these have been anthologized so many times that one can hardly bear to face them. That's not really fair to the editor since, if he had neglected some of these classics, people like me would probably have cursed him in print.

Analog is, was and probably always will be, one of the genre's best markets. There's always something there that's going to pleasantly surprise you—this collection holds more than 20 of those pleasant surprises from the magazine's first half century.

Golden Oldies

If you're interested in what the golden-era SF mags were like but don't want to pay the premium prices that col-



lectors demand for copies of the originals, Southern Illinois University has put together a facsimile edition of the July 1939 issue of *Astounding* (available from S.I.U. Press, PO 3697, Carbondale, IL 62901).

This was a landmark issue for more than one reason—herein resides the first sale Isaac Asimov made to John Campbell and A.E. van Vogt's first-ever sale. The issue also includes stories from veteran writers Nelson S. Bond, C.L. Moore and Ross Rocklynne, art from the very best SF illustrators of the day and some of the sleaziest ads ever put on pulp ("Make money cooking potato chips in your own home").

This is a fabulous trip back to what SF's senior citizens (only kidding guys) call the genre's golden age, and it really feels kind of nice to take a look at what our fictional forebears wrought.

This is optimistic, sometimes simplistic fiction—simple stories, simply told—full of action, competent men and compliant women (though they're all very good girls). It is lots of fun and I hope that they do it again. The book includes a foreword by today's *Analog* editor Stanley Schmidt and afterwords by Asimov, van Vogt and Rocklynne telling what it was like in those days to be working with Campbell and creating this strange new thing called SF. E

Two years ago, in an heroic attempt to head off an epidemic of summer ennui, FUTURE LIFE presented the public with a list of exciting, mind-bending, science-oriented attractions around the nation entitled "Summertrek." Now, in order to protect our loyal readership from any further onslaughts of that dread disease known as the "God-I'm-bored-blues," we present...

SUMMERTREK II

By BARBARA KRASNOFF

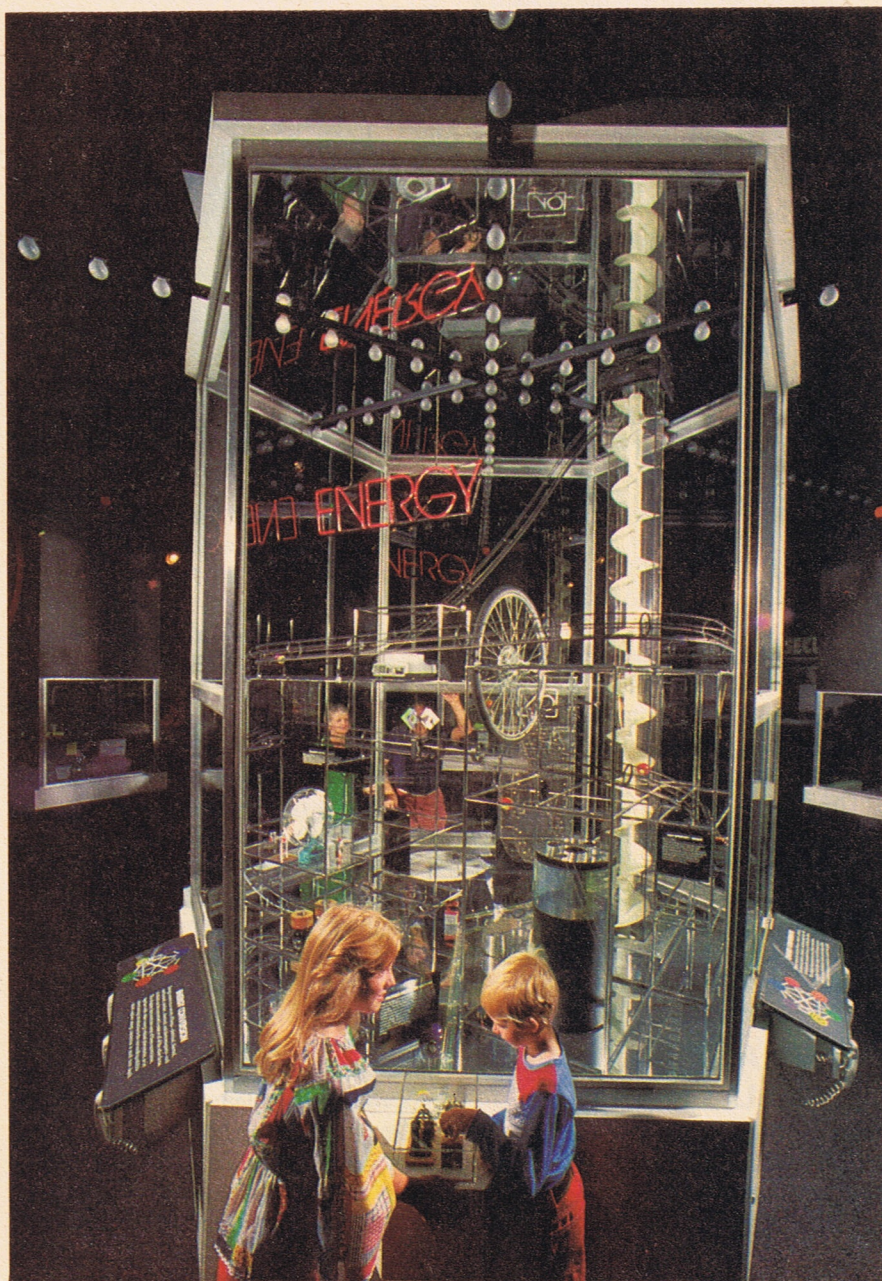
CORNING MUSEUM OF GLASS

The Corning Museum of Glass, which has been drawing a steady stream of visitors since May, 1951, now has a new home for its impressive collection of glass. The large and elaborately designed building, which opened on June 1, 1980, was specially designed to hold a major part of the museum's huge collection. It features a crystalline "time tunnel" which takes tourists on a journey from the time of Pharaoh Amenhotep II (1400 B.C.) to the present. On the way, four continuously running films describe major technical discoveries in glass technology. Against the wall of the tunnel, about 130 major objects illustrate the history and development of glass; and those who become interested in a particular period can walk off the corridor into one of the detailed gallery exhibits which are available all along the route. (Students of architecture may also wish to visit the museum in order to examine architect Gunnar Birkert's innovative approaches to structural forms, glass and the utilization of light.)

(Corning Glass Center, Corning, NY 14830. Phone: (607) 974-8276. Open daily year round except Thanksgiving, Dec. 24 and 25 and New Year's, 9 a.m.-5 p.m. Admission: \$2 adult, \$1 ages 11-17, under 11 free, \$5 maximum for a family group.)

DISNEYLAND

Very little needs to be said about Disneyland's Tomorrowland—the name says it all. This popular tourist attraction boasts such features as Adventure thru Inner Space, which takes tourists into the world of the atom; Mission to Mars, in which visitors journey to the red



Visitors examine the Energy Lab from Chicago's Museum of Science and Industry.

PHOTO COURTESY MUSEUM OF SCIENCE AND INDUSTRY

planet; and Submarine Voyage, in which they take a cruise to the North Pole. The star of this exciting lineup, though, has to be Space Mountain, a 118-foot-tall structure which takes would-be astronauts on a rollercoaster ride into deep space—all inside Disneyland's artificial mountain.

(Disneyland Guest Relations, PO Box 3232, Anaheim, CA 92803. Phone: (714) 999-4565. Summer hours (mid-June through Labor Day): Sun.-Fri., 9 a.m.-midnight; Sat. 9 a.m.-1 a.m. Contact Disneyland for information on hours after Labor Day. Admission plus 11 attractions: \$8.50 adults, \$7.25 juniors age 12-17, \$6.75 children age 3-11, under 3 free.)

EXPLORATORIUM

The Exploratorium is one of those wonderful institutions that cater to those among us who would prefer to do rather than simply watch. Containing some 500 participatory exhibits, the museum was established with the intention of not only allowing but actively encouraging visitors to see, touch, manipulate, explore, move, experiment and think, all without the fear of possible destruction that usually accompanies visits to museums. Did you break something? Don't worry—that's the exhibit's fault, not yours.

The Exploratorium recently added a new mezzanine level, providing an additional 15,000 square feet of exhibit space; and a new 150-seat theater is now in the works. Unfortunately, they have also had to institute a new limited-admission fee after maintaining a free entry (with voluntary donations at the door) policy for 12 years. This fee "has been instituted," reads the press release, "in response to the nationwide reduction in government support to cultural institutions, including science museums such as the Exploratorium."

(The Exploratorium, 3601 Lyon St., San Francisco, CA 94123. Phone (415) 563-7337. Open Wed.-Fri. 1-5 p.m.; Wed. evenings 7-9:30 p.m.; Sat.-Sun. noon-5 p.m. Admission: \$2.50 adults (good for unlimited use of museum for a period of six months), under 18 free. Free admission Wednesdays.)

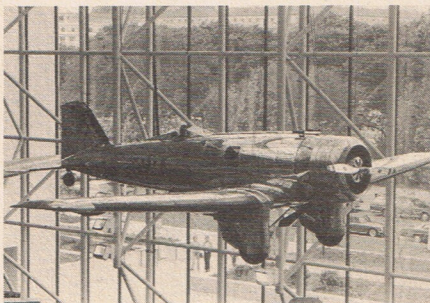
INTERNATIONAL SPACE HALL OF FAME

Does anyone out there know who Nikolai Ivanovich Kibalchich was? Well, he was the Russian gentleman who drew up the plans for the rocket airplane in 1881—while he was awaiting execution for the assassination of Czar Alexander II.

The International Space Hall of Fame is dedicated to him, and to the many other men and women who have made contributions to space research and exploration. Opened in October, 1976, the collection of permanent and traveling exhibits is housed within a beautiful five-story glass building known locally as the Golden Cube; outside, a growing assortment of historic aircraft is available for examination by visitors to the museum.

However, one of the museum's most recent and exciting acquisitions is the IMAX/Omnimax space theater/planetarium. The eighth of its kind in the world, the Omnimax surrounds its audience with sound and photography, taking them into a whole new world of motion-picture sensations. This summer, the theater will be showing the film *To Fly*.

(The International Space Hall of Fame, PO Box 533, Alamogordo, NM 88310. Museum: (505) 437-5770. Omnimax: (505) 437-5772. Open daily, 8



National Air and Space Museum

a.m.-5 p.m. winter; 8 a.m.-6 p.m. summer. Omnimax shows: 1, 3, 5, 7, 8 p.m. Museum admission: \$1.50 adults, \$1 ages 13-17, 75¢ age 6-12, under 6 free. Omnimax admission \$3 adults and children over 13, \$2 age 5-12 and sr. citizens.)

KIDSPACE MUSEUM

While our younger readers will be able to enjoy most of the attractions listed in this article, there is at least one museum which caters specifically to children. Kidspace, which recently opened new, permanent quarters in Pasadena, is dedicated to both satisfying and stimulating the curiosity of youngsters.

Some of the more popular features are: "Gutsie," a huge stuffed doll whose innards are both visible and appropriately labeled; "Illusions," in which youngsters can experience a full range of human perceptions; the "Neon Sculpture Room," which allows for experiments in art, rhythm and harmony; and the "Web Walk," which demonstrates a predator-versus-prey situation.

Budding futurists will want to visit the space and technology area, which has exhibits by JPL and Caltech, and includes a guided tour by resident robot Herman.

(Kidspace, 390 S. El Molino Ave., Pasadena, CA 91101. Phone: (213) 449-9143. Open to school tours Tues.-Thurs at 9:30, 10:30 and 11:30 a.m.; open to the public Thurs. 3-5 p.m. and Sat. 10 a.m.-4 p.m. Admission free.)

MUSEUM OF BROADCASTING

Whether you consider it a source of entertainment, a transmitter of information or a boob tube, television is unarguably a major influence in the U.S. today. Those who wish to study this cultural phenomenon, or who simply wish to bask in the classic television and radio scenes of yesteryear, should visit The Museum of Broadcasting. This one-of-a-kind museum recently expanded from two to five floors to accommodate the many visitors it attracts; and they can now view tapes either in the 63-seat theater or at one of the 23 individual consoles. Programs available range from the McCarthy hearings of the 1950s to the Moon shots of the 1970s; from *I Love Lucy* to *Star Trek*. There are also many radio shows available—science fiction afficianados, for example, may want to spend an afternoon listening to Orson Welles' *War of the Worlds*.

(The Museum of Broadcasting, 1 East 53rd St., New York, NY 10022. Phone: (212) 752-7684. Open year round, Tues.-Sat., noon-5 p.m. Suggested contributions: \$2 adults, \$1 senior citizens and children under 13.)

MUSEUM OF HOLOGRAPHY

The Museum of Holography celebrates what may be the major art form of the 21st century: holography, the science of using lasers to form three-dimensional images. Established in 1976, the museum not only runs continuous exhibitions of the latest in holographic art, but in addition operates an information service, provides lectures and films on holography, distributes literature on all aspects of the medium and publishes a directory every two years on people active in the field.

First-time visitors are advised to begin by examining "In Perspective," a fascinating exhibit which traces the history and development of the various types of holography. Afterwards, they

can delight in the strange world of three-dimensional photography: grabbing at realistic images that aren't really there, watching a miniature group of dancers execute a short, silent performance, or staring as ghostly celebrities grin at them from holographic film.

(Museum of Holography, 11 Mercer St., New York, NY 10013. Phone: (212) 925-0526. Open Wed.-Sun., noon-6 p.m., Thurs. until 9 p.m. Thursday lectures at 7:30 p.m. Admission: \$2 adults, \$1 children and senior citizens.)

MUSEUM OF SCIENCE AND INDUSTRY

The Museum of Science and Industry has enough shows, exhibits and "please touch" objects to sate even the most ardent science fan. The building's approximately 14 acres holds an enormously varied compendium of science exhibits, all dealing with the laws of science and the applications of technology. For example, space enthusiasts can view the actual Apollo 8 command module; those concerned with energy can visit the Energy Lab, portions of which are powered by solar energy; amateur biologists can examine the Dynamic Kidney or look into efforts to conquer cancer; etc., etc. The place is a treasure house of futuristic, multi-media exhibits.

Special events for this summer include monthly science field trips, and an exhibit examining the art of Disney animation.

(Museum of Science and Industry, 57th St. and Lake Shore Drive., Chicago, IL 60637. Phone: (302) 684-1414. Summer hours: daily 9:30 a.m.-5:30 p.m. Winter hours: Mon-Fri. 9:30 a.m.-4 p.m.; Sat., Sun. and holidays 9:30 a.m.-5:30 p.m. Admission free.)

NATIONAL AIR AND SPACE MUSEUM

The National Air and Space Museum will be featuring several very special events this summer. From July 1-5, the museum will present a new exhibit gallery, free concerts and workshops as part of its fifth anniversary celebration, the highlight of which will be a public birthday party on July 1 from 9 p.m. through midnight.

In addition, two new exhibits will be available: "Assignment: Aviation," an exhibition of photo-realist art on the theme of aviation; and "America's Space Truck—the Space Shuttle," featuring—you guessed it—information

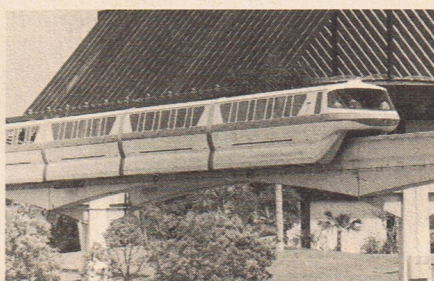
about the *Columbia* space shuttle, including models of the craft and of future payloads.

The Albert Einstein Spacearium, one of the most advanced planetariums in the world, will be presenting a multimedia show entitled "New Eyes on the Universe." The Air and Space Theater will be showing two films: *To Fly*, an aerial tour of America from balloons through spacecraft; and *Living Planet*, which explores the ecology of planet Earth.

(National Air and Space Museum, Smithsonian Institution, Washington, D.C. 20560. Phone: (202) 381-6264. Open daily, year round. Hours: April 1-Labor Day, 10 a.m.-9 p.m.; all other times 10 a.m.-5:30 p.m. Admission free.)

OMNITHEATER

The Omnitheater is a huge space theater/planetarium: one of the IMAX super-theaters noted for the way in which they surround their audiences with images. The effect can be



Walt Disney World

phenomenal—a sense of actually being there, following a balloon through the sky or a ship through the outer reaches of space.

One of the first museums to boast such a theater is the Science Museum of Minnesota, which this summer will be showing *The Great Barrier Reef*. This film will take viewers underwater, through an empire of coral reefs, islands and sheltered seas which stretches more than 1,200 miles off the coast of Australia.

In addition, the museum itself will be showing such exhibits as "The Eye of Science," a photographic look at how the power of the human eye is extended through technology; and "Images of Earth from Space," which will feature photos taken by the Landsat satellite.

(Omnitheater, The Science Museum of Minnesota, 30 East 10th St., St. Paul MN 55101. Omnitheater shows: (612) 221-9400; museum: (612) 221-9488. Museum hours: Tues.-Sat., 9:30 a.m.-9 p.m.; Sun. 11 a.m.-9 p.m.; open Mondays from April 13th through Labor Day. Omnitheater summer schedule

(June 8th-Labor Day): Mon.-Thurs., 11 a.m., noon, 1, 2, 3, 4, 7, 8 p.m.; Fri-Sat., 11 a.m., noon, 1, 2, 3, 4, 7, 8, 9 p.m.; Sun. noon, 1, 2, 3, 4, 7, 8 p.m. Museum admission: \$3 adults, \$2 sr. citizens and children 12 and under. Omnitheater admission: \$4.50 adults, \$3.50 sr. citizens and children. Combination admissions: \$5.50 adults, \$4 sr. citizens and children.)

PLANET OCEAN

This nonprofit attraction, owned and operated by the International Oceanographic Foundation, places an emphasis on active learning experiences in teaching the public about Earth's oceans. The popular facility boasts more than 100 ocean experiences and panoramic, multi-media theaters using advanced audio-visual techniques.

Planet Ocean features among its exhibits a complete indoor hurricane, the world's largest computerized wave tank, a cluster of electronic-participation fish behavior exhibits and a ghostly sea captain who spins weird tales of the mysteries of the seven seas. Other major theme areas include the Solar System, Man in the Sea and Birth of the Oceans; and both children and adults can explore the inside of a submarine, dock a computerized oil tanker (hopefully without polluting the ocean in the process!) and touch Florida's only iceberg.

(Planet Ocean, 3979 Rickenbacker Causeway, Virginia Key, Miami, FL 33149. Phone: (305) 361-9455, en Espanol (305) 361-9456. Open daily year round 10 a.m.-6 p.m. Admission: \$5 adults, \$2.50 children age 6-12, under 6 free.)

WALT DISNEY WORLD

Walt Disney World, the second of the two Disney entertainment kingdoms, also has its Tomorrowland, replete with all the futuristic rides and attractions that any space kid could want. Science fiction enthusiasts who reside on the East Coast can also experience the excitement of the Space Mountain roller coaster ride and look into the tomorrow of GE's Carousel of Progress. And after an exhausting morning of space travel, they can take the WEDway PeopleMover to such eateries as the Lunching Pad and the Space Bar.

(Walt Disney World, PO Box 40, Lake Buena Vista, FL 32830. Phone: (305) 824-4500. Open daily, year round, 8 a.m.-midnight. Admission with ten adventures: \$11.50 adults, \$10.50 juniors age 12-17, \$9.50 children age 3-11, under 3 free.)

Otto Luening's 20th Century Odyssey

Though admittedly not one of the burning issues keeping world leaders awake at night, the question of what's happened to "classical music" in this century is at least a vexing one to those who care. From a prominent position in the cultural mainstream of 80 years ago, so-called "serious music" (work of artistic pretension, as opposed to work of popular appeal) has pushed itself into a nearly invisible cul-de-sac, with little sign of finding its way back out in the foreseeable future. While never a truly "popular" music (as are the folk and dance varieties), Western classical music used to enjoy regular, well-attended public performance, and did reflect some real sense of the time and place in which it was written. But today, classical music seems to have polarized itself into two opposing camps: the museum-like forum of concert halls and opera houses for the dessicated, traditional repertoire; and the cloistered aridity of college campuses and poorly-attended, state-subsidized recital venues for the largely unlistenable contemporary repertoire.

Why has all this happened? Times have changed, of course, and one can't really expect the matrix of art and culture to remain static in the face of that change. While it is true that mass tastes have stubbornly resisted changing with the times (an orchestra that plays and replays the familiar Mozart, Beethoven, etc. selection stands a much better chance of filling its hall than the orchestra that strays into the dangerously dissonant territory of 20th-century modernist works), the fault also lies with the composers themselves, who have for the most part lost touch with their audience, and often seem to write music for the listening tastes of their colleagues and no one else. This criticism is not in any way new or revolutionary. Music critic Henry Pleasants proclaimed, "Serious music is a dead art," in his 1955 book, *The Agony of Modern Music*, and in a recent *New York Times* Sunday Magazine article, commentator Harold Schonberg (an admitted romantic classicist) opined that not one serious music piece of any significance had emerged in the last 25 years.

Whatever the truth behind the failure

of classical music may be, a fascinating personal perspective on this century's musical progress is offered in a remarkable new book, Otto Luening's autobiography, *The Odyssey of An American Composer* (Charles Scribner's Sons, \$22.50). Although few people seem aware of it, Luening is one of the major figures currently working in serious music, and this look back on his eventful, 80-year life gives abundant insights into why this is so. Almost alone among his peers, Luening has repeatedly displayed the ability to fuse elements of emotive passion and intellectual rigor in his works, in a time when the latter almost always outmuscles the former. An avant-gardist with a searching intellect, he has always paid careful attention to the simple, humanistic aspects of his music, mixing dissonance with melodic beauty and simplicity with arcane harmonic complexity—in a sense salving the abrasiveness of the new with the soothing balm of the traditional. What Luening writes about his early teacher and mentor, Ferruccio Busoni, could easily apply to himself: "Much of the composing by process, which has become so fashionable today, was anathema to him. Many of our contemporary improvements on older civilizations would not have appealed to him. He hated war, brutality and violence, and seemed to reach a realm of pure spirit at times. . . ."

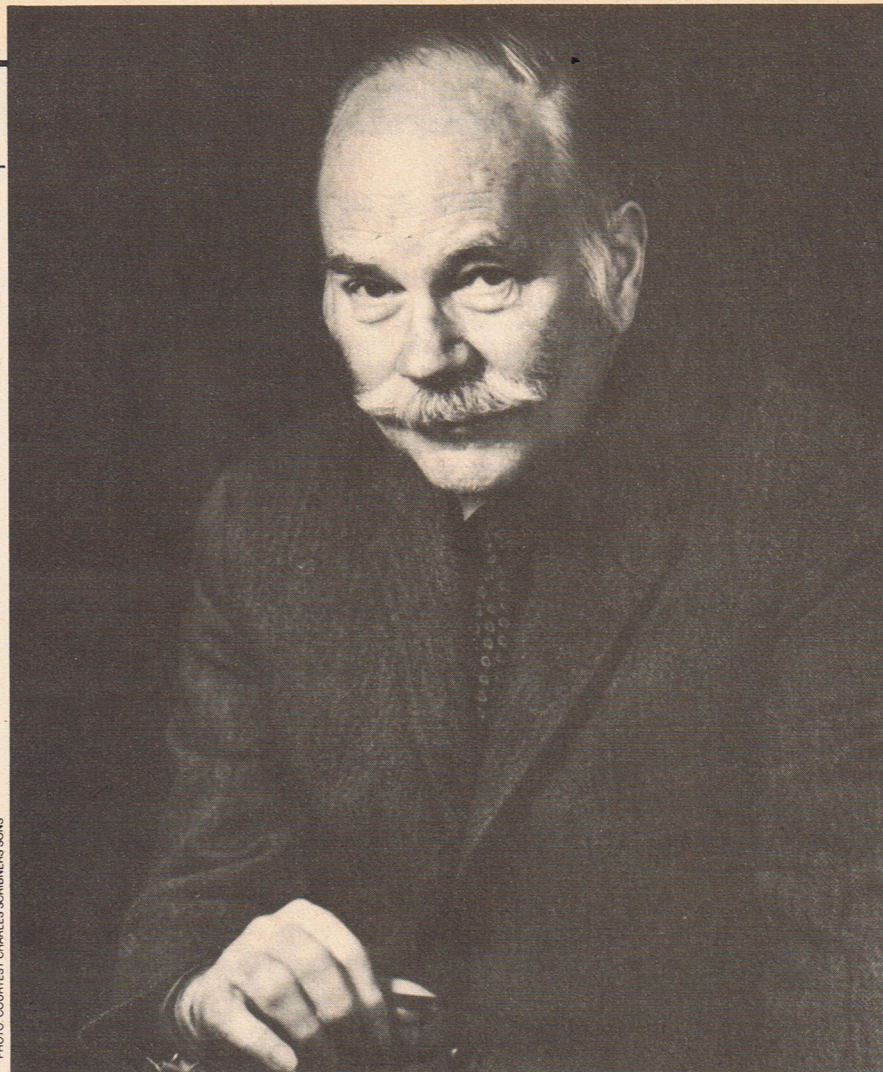
But aside from being a recounting of a remarkable man's life, *The Odyssey of An American Composer* is also an historical/cultural document spanning one of the most volatile and exciting eras of modern history. Not content to be merely observer or interpreter, Luening—whether by design or serendipity—frequently found himself at the core of the central cultural ferment of the time. The saga of his odyssey is almost fictionally complete: from his early boyhood on a Wisconsin farm, to adolescence in pre-WWI Munich, to his wartime refuge in Zurich (where he dined in the same restaurant as the young Lenin, and later witnessed the revolutionary's return to Russia, drank cognac with the Dadaists, acted in James Joyce's theater company, and began in earnest his career as a serious composer

of merit), then his return to the U.S.A. where he was instrumental in establishing the contemporary repertoire in American opera companies, performance groups and college music departments (the Eastman School of Music, Bennington College, Barnard College, Columbia University—all major institutions). Only then did he enter the phase of his career for which he is most well-known (although he seems to regard it as an interesting, 20-year tangential experiment), the pioneering of electronic music in the United States.

Luening credits Columbia University colleague Vladimir Ussachevsky with first introducing him to tape recorder sound manipulation in the fall of 1951, and also with presenting the first U.S. concert of such music on May 9, 1952. Luening began his collaborative foray into the realm of tape music with Ussachevsky that summer, when they took the University tape machine on the road, first to a composer's conference at Bennington College in Vermont, and later to the home of influential composer/theorist Henry Cowell. There the two used the primitive magnetic recorder to alter the sounds of Luening's flute (later Ussachevsky's piano as well), producing "City Nocturne," "Country Nocturne" and "Insect Nocturne" for a performance at Bennington in August. The reaction was predictable—some present were ecstatic, some offended, all were astounded. When word of the performance leaked back to New York, the pair was invited to present their tape compositions at a new music concert, scheduled for the Museum of Modern Art on October 28, 1952. That concert, where Ussachevsky's "Sonic Contours" and Luening's "Low Speed," "Invention" and "Fantasy in Space" saw their premieres, was to signal the arrival of a new era in music.

Luening continued as both pioneer in his own work and champion for the innovative work of others. Together with Ussachevsky and fellow composer/educators Milton Babbitt and Roger Sessions, he helped establish the influential Columbia-Princeton Electronic Music Center in 1959. This was accomplished through an elaborate series of maneuvers, resulting in a minimal

PHOTO COURTESY CHARLES SCHIBERS SONS



amount of funding and support from the institutions involved, but a large grant from the Rockefeller Foundation and a room-sized, state-of-the-art Mark II synthesizer on indefinite loan from RCA. The Electronic Music Center became the studio for experimental music in the U.S.A. during the '60s, providing facilities for such important composers as Walter Carlos, Mario Davidovsky and Charles Wuorinen (the latter two winning Pulitzer Prizes for works produced at the EMC). Today, Luening fondly remembers Walter (now Wendy) Carlos as an exceptional student with superior technical abilities. He recalls with a chuckle, "I made him stay in the graduate program until I felt he was a real creative musician, and not just a technician—his father wanted to sue me for keeping him in that long."

Recordings

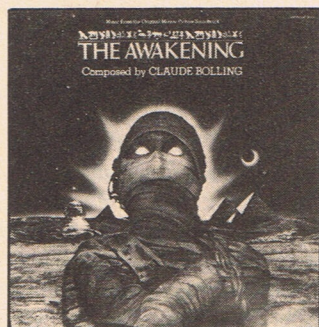
Those of you who might also be interested in hearing some of Otto Luening's music (needless to say, I think you should—whether you have an interest in serious music or not), are directed to a record label called Composer's Recordings, Inc. (CRI). It is a

non-profit, tax-exempt organization that has been releasing contemporary American music unavailable elsewhere since 1954 (not surprisingly, Otto Luening numbers among its founders). At last count they had issued more than 1,000 compositions, by 450 composers on 350 discs (with 18 new ones added every year)—and unlike most commercial record companies, CRI does not delete a record once it has been released. Their list is an impressively eclectic sampling of maverick American music-makers, including John Cage, Henry Cowell, Harry Partch, Charles Ives, Aaron Copland and Virgil Thompson among others; all chosen by a rotating board of 14-16 judges. One of my own personal favorites is Luening's *Sonata for Piano in Memoriam Ferruccio Busoni* (CRI 334), a strikingly beautiful work for solo piano that artfully embraces a wide range of styles, idioms and motifs. Also available is the *Columbia-Princeton Electronic Music Center 10th Anniversary Album* (CRI 268), a two-record set that includes Luening's "In the Beginning (from Theater Piece #2)" as well as works by Ussachevsky, Varese, Babbitt, Davidovsky and others con-

nected with the EMC. Two of Luening and Ussachevsky's early tape compositions, "A Poem in Cycles and Bells for Tape Recorder and Orchestra" and "Suite for King Lear for Tape Recorder" (the latter commissioned by Orson Welles for his 1955 N.Y.C. production of the Shakespearean drama) are contained on CRI 112 along with other works, while the pieces created by the pair for the 1952 public debut of tape music can be found on the Desto label (DC 6466), entitled *An Historic Concert (Selected Works From the 1952 Museum of Modern Art Concert)*. GRI's address is: 170 West 74th Street, New York, NY 10023; phone (212) 873-1250. Write for their catalog, or urge your local retailer to place an order for you, or better yet, stock a selection in his store.

In his book, Luening perceptively puts his finger on the aesthetic problems of electronic music composition, and by extension, those of any avant-garde pursuit. He writes, "After discovering that with electronic sound almost anything was possible, it was necessary to meditate about how much of it was possible to perceive, and by what means it could bring human satisfaction along with the novelty of the shock." The fact that Otto Luening is driven to find the meeting ground of the human and the innovative has set him apart from many of his contemporaries in both mainstream and avant-garde contingents of serious music. *The Odyssey of An American Composer* details the life of a man who has never closed himself off to new ideas, new ways of expressing himself, and has always left his personal, warmly human stamp on the results. Recently, Luening has returned to writing for traditional instruments, in search of simple, graceful means of expression. Still artistically and physically vigorous on the threshold of his 81st year, with a quick tongue and a refreshing sense of humor, Otto Luening stands as a model artist of the 20th century, integrated with his time, his art and his own humanity. Surely, if there were more like him in his field, serious music wouldn't be in the dire shape that it is. *The Odyssey of An American Composer* is recommended to all readers as an exemplary document of one man's life and the era in which he lived. Though the book is a bit expensive for most student budgets, no public or institutional library should be without it. E

SOUNDTRACK SPECTACULAR



THE AWAKENING

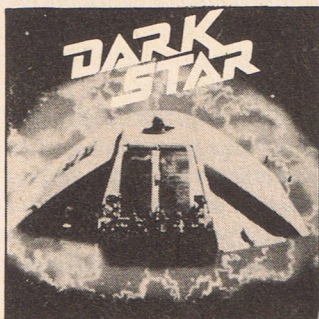
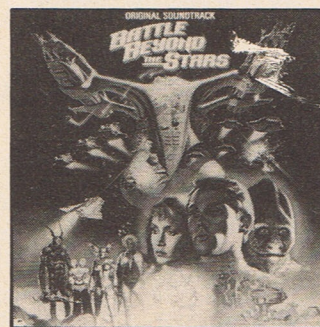
Starring: Charlton Heston, Susannah York and Jill Townsend. French composer Claude Bolling (*Borsalino*, Neil Simon's *California Suite*, *Willie and Phil*, etc.) has created a mysterious exotic score for this modern gothic horror movie, and the original soundtrack music has been beautifully arranged and pressed by Entriacte Records.

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BATTLE BEYOND THE STARS

Starring Richard Thomas and a bizarre cast of aliens in a humorous space adventure exploding with visual effects. The soundtrack score (hard to find) is an exciting orchestral kaleidoscope... one of the best SF movie albums in a long time, from Rhino Records.

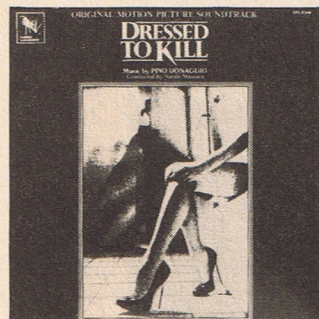
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DARK STAR

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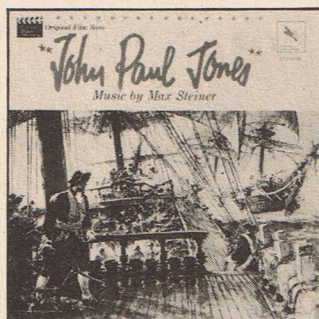
Cult SF film soundtrack, music and dialogue.



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Sensational DePalma thriller.

Exciting Herrmann-esque music.



JOHN PAUL JONES

Composer Max Steiner conducts

thrilling adventure score.



THE HOWLING

Pino Donaggio's latest horror score is exciting and richly symphonic.



KNIGHTS OF THE ROUND TABLE

Miklos Rozsa stereo rouser to CinemaScope epic.



SAMSON AND DELILAH

Romantic C.B. DeMille drama, music by Victor Young.



TOUCH OF EVIL

Joseph Gershenson conducts thriller music by Henry Mancini.



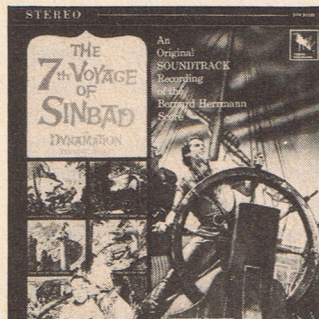
CAPTAIN HORATIO HORNBLOWER

Robert Farnon conducts his score for adventure/sea epic.



MAD MAX

Dynamic, percussive music to futuristic adventure film.



7th VOYAGE OF SINBAD

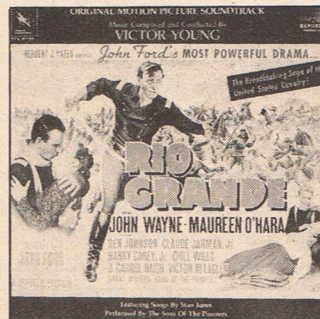
Herrmann conducts original soundtrack. First time in stereo!



ROCKETSHIP: XM

The Classic 1950 SF/adventure movie, with music by Ferde Grofe.

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Ford/Wayne classic, with score by Victor Young. Songs by Sons of Pioneers.



EMPIRE STRIKES BACK (Digital)

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DIGITAL SPACE (Digital)

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This is a digital sampler and demonstration record with a sensational sense of depth and space—highest quality imported pressings.



SOUNDTRACK SPECTACULAR

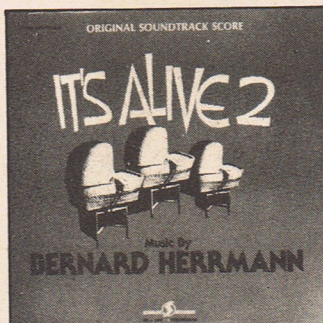
First Men in the Moon And Other Original Motion Picture Scores

The London Studio Symphony Orchestra Composed
& Conducted by LAURIE JOHNSON

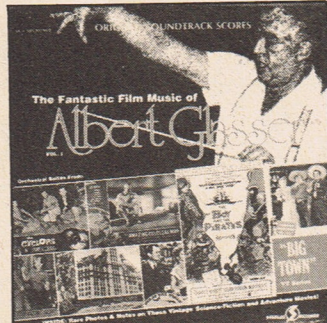
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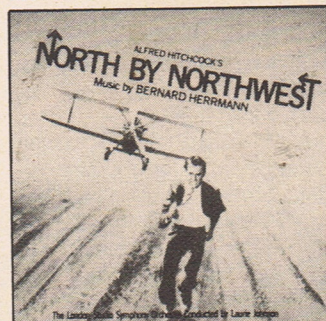
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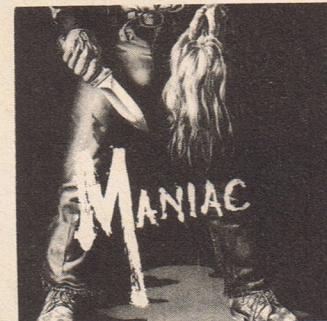
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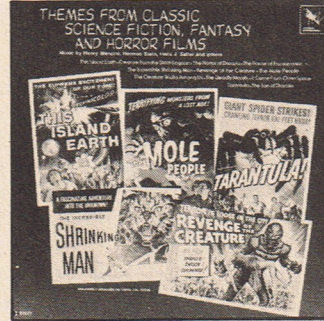
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PHOTO © 1981 JAY KAY KLEIN

Robert A. Heinlein is one of the grand old masters of science fiction. Born in 1907, his first story, "Life-line," appeared in *Astounding* in 1939; and he has been going strong ever since. Heinlein's work includes such popular SF novels as: *Starman Jones*, *Starship Troopers*, the Hugo Award-winning *Stranger in a Strange Land* (which brought the word "grok" into the American vocabulary), and recent best-seller *The Number of the Beast*.

"OVER THE RAINBOW—"

The new President had not been in office ten days before it became clear to his own party as well as to the "loyal opposition" that he was even more of a disaster than the defeated candidate had predicted. Nevertheless the country was shocked when he served even fewer days than the ninth President—killed in a crash, his private plane, himself at the controls; dying with him his three top aides: White House chief of staff, press secretary, appointments secretary.

No U.S. or Canadian news medium said a word about alcohol or incidents in the dead President's past; they treated it as a tragic accident. Papers and TV reporters elsewhere were not as reticent.

The Speaker of the new House saw the ex-Vice President first (even before the oath of office) as the Speaker's seniority in line of succession enabled him to do. He came right to the point. "I am ready to take this load off your shoulders. We both know that you were picked simply to support the ticket; no one ever expected to load you down with *this*. Here's how we'll do it: You resign at once, then we'll meet the press together—after I'm sworn in. I'll do most of the talking. I promise you, it won't be a strain on you."

"I'm sure that it won't be. You're excused."

"Huh!"

"You may leave. In fact, I am telling you to leave. I thought you had come to stand beside me as I take the oath... but you have something entirely different in mind. You would not enjoy staying; I would not enjoy having you stay."

"You'll regret this! You're making a mistake!"

"If a mistake was made, it was made at the Convention. By you and five others, I be-

lieve; I was not present. Yes, I may regret it but this is what I undertook to do when I accepted the nomination for the Vice-Presidency. Now get out. *Pronto!*"

The new President sent for the Director of the Budget 40 minutes after the swearing in. "Explain this to me."

The Director hemmed and hawed and tried to say that the budget was too technical for anyone not in public life before—

—and was answered, "I'm accepting your resignation. Send in your deputy."

It was almost a week before this call was made: "Admiral? This is the President. If I come to your home, do you feel well enough to see me?"

There was a tussle of wills that the Admiral won only through pointing out that it was never proper to subject the President of the United States to unnecessary risk of assassination... and that with his new car, fitted for his wheelchair, he still went to the Pentagon twice a week. "I'm old, I admit; I was born in 1900. But I'm not dead and I'm quite able to report to my Commander in Chief. And we both know that threats have been made."

The President won the next argument. On being wheeled in the Admiral started to get out of his chair. "Do please sit down!"

The Admiral promptly sat back down, caught his breath and said formally, "Ma'am, I report—with great pleasure!—to the President of the United States!"

"Thank you for coming, sir. In view of our respective ages... and your health, I felt that it was a time to dispense with protocol. But you are right; there are indeed a flood of threats, many more than get into the news. I don't intend to be a target... at least until we have a new Vice President sworn in."

"Never be a target, Madam. You would be mourned by everyone, both parties. Uh, if I may say so, you are even more beautiful in person than you are on the screen."

"Not mourned by everyone, I'm certain, or I would not have to be cautious about

assassination. As for that other, I'm not beautiful and you know it. I know what I have. I project. But it's not physical beauty. It's something that a pro—a professionally competent actress—does with her whole being. Her voice, her expression, her hands, her body. A gestalt, with regular features the least important factor. Or not present, as with me."

The President smiled, got up and went around the big desk, leaned over the Admiral, kissed his forehead. "But you are an old dear to have said it."

He cleared his throat, noisily. "Ma'am, what is your opinion in the matter against that of millions of men?"

"We've dropped that subject. Now to work! Admiral, why is it that there has been so much difficulty with nuclear power plants ashore but never any trouble with your nuclear submarines?"

* * *

The President slapped her desk, glared at the leader of the delegation. "Stop that! Han'kerchief head, you've come to the wrong church. In this office there are *no* blacks—or Blues, Whites, Greens or Yellows—just Americans. Besides that, you claim to be a Black representing Blacks. Hm-mph! That's a phony claim if I ever—"

"I resent that, Mrs. Ni—"

"*Pipe down!* 'Madam President,' if you please. And one does *not* interrupt the President. I said your claim was phony. It is. I'm at least three shades darker than you are... yet I'm smooth brown, not black." She looked around. "I don't see a real sooty black in your whole delegation. Mmm, I see just one darker than I am. Mr. Green, isn't it? That is your name?"

"Yes, Madam President. From Brooklyn."

"Any white blood, Mr. Green? Perhaps I should say 'Any Caucasian ancestry?'"

"Possibly. But none that I know of, Ma'am."

"We're all in that boat... including all whites. A person who claims to be absolutely certain of his ancestry more than three generations back is accepting the short end of a bet. But since you are from Brooklyn, you can help me pass a word. An important word, one that I'll be emphasizing on the networks tonight but I'll need help from a lot of people to let *all* the people know that I mean it. A Black who gets elected from Brooklyn has lots of Jewish friends, people who trust him."

"That's right, Madam President."

"Listen to my talk tonight, then pass it on in your own words. This nation has split itself into at least a hundred splinter groups, pressure groups, each trying for a bigger bite of the pie. That's got to *stop!*—before it kills us. No more Black Americans. No more Japanese Americans. Israel is not our country and neither is Ireland. A group calling itself



SRMaddo©

La Raza had better mean the human race—the whole human race—or they'll get the same treatment from me as the Ku Klux Klan. Amerindians looking for special favors will have just two choices: Either come out and be Americans and accept the responsibilities of citizenship... or go back to the reservation and shut up. Some of their ancestors got a rough deal. But so did yours and so did mine. There are no Anglos left alive who were at Wounded Knee or Little Big Horn, so it's time to shut up about it.

"But race and skin color and national ancestry isn't all that I mean. I intend to refuse to see any splinter group claiming to deserve special treatment not accorded other citizens and I will veto any

(Editorial in the Springfield Eagle)

LIFE INSURANCE

The President's surprise nomination of the House Minority Leader for the vacant vice-presidency has produced some snide theories, one of the nastiest being the idea that she fears a plot on her life by the wheeler-dealers who put the late President into office, so she is spiking their guns (literally!) by rigging things to turn the presidency over to the opposition party should anything happen to her....

...prefer to take her at her word, that her objective is to get the country unified again, and that a woman and a man, a

marked page, read aloud: "—I have learned this about engineers. When something *must* be done, engineers can find a way that is economically feasible.' Is that true?"

"I think so, Ma'am."

"You're an engineer."

"I am an *obsolete* engineer, Ma'am."

"I don't expect you to do the job yourself. You know what I did about fusion power plants."

"You sent for the one man with a perfect record. I've seen the power ship moored off Point Sur. Brilliant. Solved an engineering and a public-relations problem simultaneously."

"Not quite what I mean. I consulted the Admiral, yes. But the job was done by his first deputy, the officer he has groomed to replace him. And by some other Navy people. Now we're working on ways to make the key fission-power people—safety control especially—all former Navy nuclear submariners. But we have to do it without stripping the Navy of their Blue and Gold crews. On things I know nothing about—most things, for this job! I consult someone who *does*—and that leads me to the person who can do it. Since I know very little about how to be President, I look for advice on almost everything."

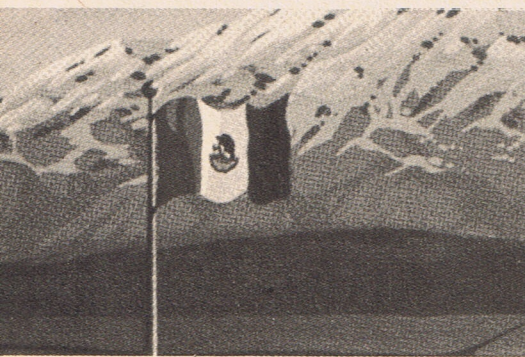
"Ma'am, it seems to me—and a lot of other people—that you were born for the job."

"Hardly. Oh, politics isn't strange to me; my father held office when I was still a girl at home. But I did my first television commercial at 14 and I was hooked. If I hadn't been 'resting' between contracts, I would not have had accepted the Governor's appointment—I was just his 'exhibit coon' but the Commission's work did interest me. Then I was still an 'exhibit coon' when he saw to it that I was on his favorite-son slate. Then, when the three leading candidates deadlocked, my late predecessor broke the deadlock in his favor by naming me as the other half of his ticket. I went along with it with a wry grin inside, figuring, first, that the ploy wouldn't work, and second, that, if he *did* get nominated, he would find some way to wiggle out—ask me to withdraw in favor of his leading rival or some such."

She shrugged. "But he didn't—or couldn't. I don't know which; he rarely talked to me. Real talk, I mean. Not just, 'Good morning,' and, 'Did you have a comfortable flight' and not wait for an answer."

"I didn't care. I relished every minute of the campaign. An actress sometimes plays a queen... but for four months I got to *be* one. Never dreaming that our ticket would win. I knew what a—No, *de mortuis nil nisi bonum*, and we must get back to work. What would you do about pollution of streams?"

"Eh? But that one has already been solved. By one of the Scandinavian countries, I believe. You simply require every user to



"This nation has split itself into at least a hundred splinter groups, each trying for a bigger bite of the pie. That's got to stop!"

legislation perverted to that end. Wheat farmers. Bankrupt corporations. Bankrupt cities. Labor leaders claiming to represent 'the workers'... when most of the people they claim to represent repudiate any such leadership. Business leaders just as phony. *Anyone* who wants the deck stacked in his favor because, somehow, he's 'special.' "

The President took a deep breath, went on: "Any such group gets thrown out. But two groups will get thrown out so hard they'll bounce! I'm a woman and I'm Negro. We've wiped the Jim-Crow laws off the books; I'll veto any Crow-Jim bill that reaches this office. Discrimination? Certainly there is still discrimination—but you can't kill prejudice by passing a law. We'll make it by how we behave and what we produce—not by trick laws."

"I feel even more strongly about women. We women are a majority, by so many millions that in an election it would be called a landslide. And *will* be a landslide, on *anything*, any time women really want it to be. So women don't need favors; they just need to make up their minds what they want—then take it." The President stood up again. "That's all. I'm going to devote this term to those 'unalienable rights'—for *everybody*. No splinter groups. Go tell people so. Now git... and don't come back! Not as a splinter group. Come back as *Americans*."

Republican and a Democrat, a White and a Black, could be the team to do it.

The Speaker of the House has still not commented, but his floor leader and the nominated minority leader appeared with the President when she announced her choice. The Senate President Pro Tempore said, "I see no reason why confirmation should not go through quickly. I've known Don for 30 years; I trust that I am not so narrow-minded that I can't recognize presidential caliber in a man of another party....

...customary to be of the same party, there is a custom just as long standing (and more important) that a President have a Vice President he (she) trusts to carry out his (her) policies."

Let's back them to the limit! Let's all be *Americans* again!

* "Thanks for coming."

"Madam President, any time you send a car for me, then scoot me across the country in a hypersonic military jet, thanks should be the other way. My first experience above the speed of sound—and my first time in the Oval Office. I never expected to be in it."

She chuckled. "Nor did I. Especially on this side of this desk. Let's get to work." She held up a book. "Recognize this?"

"Eh?" He looked startled. "Yes, Ma'am, I do. I should."

"You should, yes." She opened to a

place his intake immediately downstream from his discharge of effluent into the stream. In self-protection the user cleans up his discharge. It's self-enforcing. No need to test the water until someone downstream complains. Seldom. Because it has negative feedback. Ma'am, complying with a law should be more rewarding than breaking it—or you get a positive feedback."

She made a note. "We could clean up the Mississippi that way. But I'm fretted about streams inside States, too. For example, the Missouri, where it is largest, is entirely inside the State of Missouri."

"Ma'am, I think you'll find that you have jurisdiction over *all* navigable streams."

"I do?"

"Ma'am, you have powers you may never have dreamed existed. A 'navigable stream' is one only three feet deep, I think. You may right now have the power to order this under law already on the books. If there is a paragraph or even a clause on placement of inlets and outlets, you almost certainly can issue an executive order right away. Today. The boss of the U.S. Engineers would know. General Somebody. A French name."

She touched a switch. "Get me the head of the U.S. Engineers. How would you dispose of nuclear power plant wastes? Rocket them onto the Moon as someone urged last week? Why wouldn't the Sun be better? We may want to go back to the Moon someday."

"Oh, my, no! Neither one, Ma'am."

"Why not? Some of those byproducts are poisonous for hundreds of years, so I've heard. No?"

"You heard correctly. But the really rough ones have short half-lives. The ones with the long half-lives—hundreds, even thousands of years, or longer—are simple to handle. But don't throw away *any* of it, Ma'am. Not where you can't recover it easily."

"Why not? We're speaking of *wastes*. I assume that we have extracted anything we can use."

"Yes, Ma'am, anything *we* can use. But our great grandchildren are going to hate you. Do you know the only use the ancient Romans had for petroleum? Medicine, that's all. I don't know how those isotopic wastes will be used next century... any more than those old Romans could guess how *very* important oil would become. But I certainly wouldn't throw those so-called wastes into the Sun! Besides, rockets do fail... and who wants to scatter radioactives over a couple of States? And there's the matter of the fuel and steel and a dozen other expensive things for the rockets. You could easily wind up spending more money to get rid of the ashes than you ever got from selling the power."

"Then what *do* you do? They say we mustn't sink it into the ocean. Or put it on the Antarctic ice cap. Salt mines?"

"Madam President, honest so help me, this is one of those nonproblems that the anti-technology nuts delight in. Radioactive

wastes aren't any harder to handle than garbage. Or hot ashes. Or anything else you don't want to pick up in your bare hands. The quantity isn't much, not at all like garbage, or coal ashes. There are at least a half dozen easy ways. One of the easiest is to mix them with sand and gravel and cement into concrete bricks, then stack them in any unused piece of desert.

"Or glass bricks. Or let the stuff dry and store it in steel barrels such as oil drums and use those old salt mines you mentioned—the bricks you could leave in the open. All by remote manipulation, of course; that's the way a radioactive engineer does everything. Waldoes. That's old stuff. No trouble."

"I thought you said you were obsolete."

**"Radioactive wastes
aren't any harder
to handle than garbage.
Or hot ashes. Or
anything else you don't
want to pick up in
your bare hands."**

He grinned sheepishly. "Ma'am, it's easy to talk. As long as I know that young fellows will have to do the tedious drudgery that goes into making anything new work. But the solutions I've offered *are* practical. No new discoveries needed."

"How about air pollution?"

"What sorts, Ma'am? The two main sources are internal combustion engines—trucks and autos—and industrial smokes. Quite different problems."

"Pick one."

"Transportation pollution is going to solve itself soon—either the hard way or the easy way. Oil, whether it's our own or from the OPEC, is too valuable to be burned in cars and trucks; it's the backbone of the chemical engineering industry—fertilizers, plastics, pesticides, lubricants and so forth. So, quite aside from the energy problem, we need to stop burning it. We can either wait until it's forced on us catastrophically... or we can turn to other transportation power voluntarily, and thereby become self-sufficient in oil for peace or for war. Either way, transportation pollution is ended."

"But *what* other transportation power, Doctor?"

"Oh. Half a dozen ways, at least. Get rid of the I.C. engine completely, both Otto cycle and Diesel cycle, and go back to the external combustion engine and steam. The I.C. engine never did make sense; starting and stopping combustion every split second is a guarantee of incomplete combustion, wasted fuel and smog. Air pollution. External com-

bustion has no such built-in stupidity; no matter what fuel, it burns continuously and can be adjusted for complete combustion. The Stanley Steamer used kerosene. But that's petroleum again. I would use wood alcohol as a starter—it hurts me every time I pass a sawmill and see them burning chips and slash.

"But wood alcohol has its drawbacks. We may burn hydrogen someday. Or learn to store electricity in less weight and less space. Or store energy in a flywheel. But all of those, even hydrogen, are simply ways to store energy. It still leaves an energy problem."

"Hydrogen, too? But you said we would burn it. No?"

"We'll burn it for some purposes; in some



ways it's an ideal fuel; it's only ash is water vapor. But Ma'am, we don't have *hydrogen*; we have *water*—and even with perfect efficiency—never achieved—the energy you get out of hydrogen by burning it cannot exceed the energy you must use in getting that hydrogen by electrolysis of water. So you must generate electricity first."

"I see. No free lunch."

"Never a free lunch. But the energy problem can be solved several ways... through renewable resources—coal and oil and cutting trees faster than they grow."

"Renewable resources—Windmills and water power and sun power?"

"Wind and water power are fine but limited. I mean effectively unlimited power. Such as this new wrinkle of thermonuclear power from the temperature difference of deep ocean and surface ocean. But there aren't too many really convenient places to do that. You named the one energy that is unlimited and convenient anywhere. Sun power."

"So? What desert is convenient to the Gary steel mills?"

"Not desert, Ma'am; the Sierra Club wouldn't like it."

"I plan to tell the Sierra Club that they are *not* the government of the United States. But in stronger language."

"I look forward to hearing you, Madam President. The Sierra Club loves deserts and hates people. But our deserts aren't sufficient. Sun power, yes—but *unlimited* sun power. In orbit."

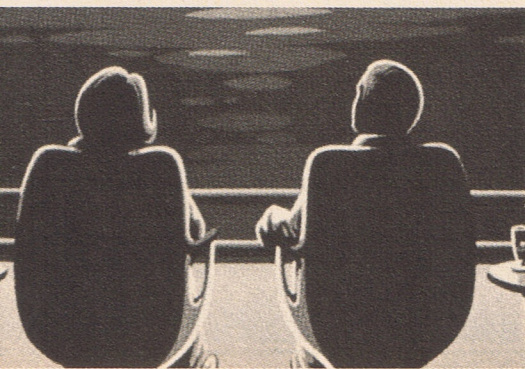
South Africa Enraged

United States Surprise Return
to Gold Standard at \$350 per
Troy Ounce of Fine Gold Has
Bourses in Turmoil

"New Policy Obvious Concomitant
of Return to Balanced Budget," Says
Treasury Secretary Spokesman

"The Way to Resume is to Resume."

By ADAM SMITH
Finance Editor



day. London opened on time but the price dropped at once, with the first purchase at \$397.127, which slowed but did not stop the decline. Winnipeg opened an hour late; the reason became clear when the Prime Minister announced the tying of the Canadian dollar to the U.S. dollar at one-to-one—a *fait accompli* as the two currencies have hunted up and down, never more than one percent apart, for the past several months.

The timing of the announcement gave the world a weekend in which to think things over, the purpose being presumably to reduce oscillations. The New York Stock Market responded with an upward surge. The Dow-Jones Industrials closed at . . .

"Mr. Chairman, are these unofficial figures I have in front of me—that each of

"If a person of normal intelligence, and a reasonably full education, cannot understand a piece of prose, then it is gibberish."

you has in front of you—correct? Or have my informants been leading me down the garden path? The figures on the use of hard drugs, for example?"

"Madam President, I don't know quite how to answer that."

"You don't eh? You're Chairman of the Joint Chiefs and for four years before that chief of staff of your service. If these figures are not right, how far are they off and which way?"

"Ma'am, that is a question that should be put to each of the services, not to me."

"So? General, you are relieved of active duty. A request for retirement will be acted on favorably, later today. You are excused. General Smith, take the chair."

The President waited until the door closed behind the ex-chairman. Then he said soberly, "Gentlemen, it gives me no pleasure to put an end to the career of a man with a long and brilliant record. But I cannot keep in a top spot in my official family a military officer who can't or won't answer questions that, in my opinion, must be answered if I am to carry out my duties as Commander in Chief. If he had answered, 'I don't know now but I'll start digging at once and won't stop until'—but he said nothing of the sort. I gave him two chances; he brushed me off." She sighed. "I suppose he dislikes taking orders from one with no military experience; I do not assume that my sex and skin color had anything to do with it. General Smith, you are in the chair by default; I can't ask you about the other services. How about your own?

Hard drugs."

"I suspect that this figure is conservative, Ma'am. I've been trying to get hard data on hard drugs since I was appointed to this job a year ago. In most cases we need evidence from medical officers to make it stick . . . and all our doctors are overworked; we don't have nearly enough of them. Worse yet, some of the doctors are pushers themselves; two were caught."

"What happened to them? Making little ones out of big ones?"

"No, Ma'am. Discharged. In civilian practice, I suppose."

"For God's sake, *why*? Has the Army forgotten how to hold a court martial? Two drug pushers, simply sent home and still licensed to practice medicine—and to prescribe drugs. General, I'm shocked."

"Ma'am, may I say something in my own defense? Then you can have my request for retirement, if you wish it."

"Please. Go ahead."

"These cases occurred before I became Chief of Staff. At the time these two were caught, I was Superintendent of the War College; drugs are not a problem there. When last I had troop duty, I *did* have a policy of treating use of hard drugs as a criminal offense, as permitted and required by regulations. But the very most I ever managed was to get some sent to the V.A. for hospital cure and rehabilitation. Under the present rules, if a man has a good lawyer—and they do, usually—he can get away from court martial and appeal to a civilian judge. That usually ends it."

"Madam President, may I add something?"

"Certainly, Admiral."

"Have you heard of the mutiny in the *Somers* about a century and a half back?"

"I—Yes, I think I have! A novel. *Voyage to the—Voyage to the First of December*. Right?"

"There was a novel some years back; I think that was the book's title. I haven't read it. Then you are aware that it was a tragic scandal, with mutineers hanged at the yard-arms. What I wanted to say was this: I think the figures on drugs in the Navy are about right—lower than in the Army, of course; the circumstances are different. But what is killing the Navy—aside from a shortage of career officer material—is that both mutiny and sabotage are out of hand . . . because offenses that used to rate hanging from the yardarm are now treated as 'Boys will be boys.' A great deal of it does derive from a change in the legal structure, as the General said. I would rather have five ships properly maintained, properly manned, shipshape and Bristol style, than ten ships undermanned and shot through with men who should never have been accepted in the first place. A stupid and sullen seaman is worse than no one at all."

The President said, "Judges, chapter seven."

WASHINGTON—The Treasury Secretary, after reading aloud to the Press the President's brief announcement of resumption of specie payments immediately at \$350/oz., emphasized that this was not a tactical maneuver to "strengthen the dollar," not an auction of bullion such as those in the past, but a permanent policy consistent with the administration's total policy. "A return to our traditional policy, I must add. A century ago, for 15 years, war caused us to suspend specie payments—but never with any intent to accept the vice of fiat money. Since 1971, as sequelae to three wars, we have had a similar problem. By letting the dollar float until the world price of gold in terms of dollars settled down, we have determined what could be called the natural price. So we have resumed specie payment at a firm gold standard. God willing, we will never leave it."

This was in answer to the London *Times* correspondent's frosty inquiry as to whether or not the Secretary thought anyone would want our gold at that price. The Treasury Secretary told him that we were not "selling gold" but promising to redeem our paper money at a gold-standard price. The *Times'* question was inspired by the fact that at the close of market Friday the London fix was \$423.195 per troy ounce, with the Zurich fix, the Winnipeg fix, and the Hong Kong fix (the last only hours before the Washington announcement) all within a dollar of the London fix.

PRAVDA: "—capitalistic trickery—"

Moscow has not had a free market in gold since pre-1914 but, as a gold-producing country, its response to our resumption policy has been even more acid than the shrill complaints from Johannesburg. The Zurich gold market did not open to-

The Admiral looked puzzled. The Marine Commandant suddenly said, "Gideon's Band!"

"Exactly. I suspect that we have been trying to meet quotas—numbers of men—rather than placing quality first. I'm sure it's not as simple as that, but that does seem to be part of it. General, does the Air Force have any different slant on this?"

"No, Ma'am, I think the Navy and the Corps both speak for me. And the Army... although Smitty's problems are different from ours. Our worst problem is hanging on to trained men... because what we teach them, flying and electronics especially, are very salable on the outside. I want to add something, though. Marijuana is not on the list of drugs. It may very well be true that grass is no worse than liquor. But neither one mixes with driving a flying machine. Or anything in an airplane. But grass is harder to cope with. A stash is easier to hide than a bottle, and it is harder to tell when a man is stoned than when he is drunk. And much harder to prove. I welcome suggestions."

"I think we all do. Although we've pinpointed one essential. Quality before quantity. Gentlemen, we'll let this marinate about ten days while all of us try to spot all of the basic things that are wrong... then meet again and exchange ideas. In writing. Call the shots as you see them, don't be afraid of hurting feelings, pay no attention to sacred cows. Admiral, you found things wrong with the military legal system; please analyse the matter, with specific recommendations. If you truly feel that we need to go back to keelhauling and hanging at the yardarm, say so."

"I do not, Ma'am. But I do think the present rules are more suited to a Scout camp than to a fighting force. Punishment should be swift and certain; mutineers should not be coddled. We need a new code."

"Work on it, I assume that you have legal aides. Mr. Secretary of Defense, I have not intended to monopolize the floor. Before we adjourn, I want you to give us your opinions on problems of discipline. I would like to hear comment on those figures I supplied, all categories. But you aren't limited to that. Feel free to bring up anything. I think that discipline in the Armed Forces is as serious a problem as I face... and the most difficult."

"Discipline is not one of the duties of the Secretary of Defense."

"So? What are your duties?"

"To manage my department. Discipline belongs to these gentlemen. Not to me. And certainly not to *you*. You are way out of line."

"You forgot something, sir. The President is in the direct line of command, at the top, and cannot avoid responsibility for any aspect of her command. The Secretary of Defense is *not* in the line of command; he is an executive secretary for the President. However, since you see your job as merely managerial, and not concerned with morale

and discipline, I won't press you about it. I have your signed resignation in my desk, inherited from my predecessor. I'm accepting it. At once."

The ex-Secretary leaned back and laughed. "How just like a woman! Ruffle her feathers and she flies off the handle. But it's okay, Shortie; I didn't intend to stay this long. After the Chief died I was ready to quit. But Charlie asked me to stick around a little longer, keep an eye on you. I know what you did to him the day of the tragedy, standing in his way when he was entitled to the job. You never were anything but an election poster. Didn't anybody ever tell you that?"

"You may leave now. You're excused."

"Oh, I'm leaving; I've got a press con-

"This country has so much going for it that it takes a lot of work combined with wrong-headed stubbornness to ruin this country. It's not easy."

ference in ten minutes. Just one thing: You said Joe probably disliked taking orders from you because you've had no military experience. Nonsense. Any top brass expects to take orders from a civilian. But no real man will take orders from a nigger, much less a nigger wench."

The Marine was out of his chair so fast that it overturned, snatched the ex-Secretary out of his chair and got a hammerlock on him—but beat the others to it only by being closest.

"Down on your knees and apologize, you jerk! That's the *President of the United States* you're talking to!" The Marine General's Deep South accent, ordinarily carefully corrected, came out in full force, thick as gumbo.

"Make him take his hands off me!"

"Keep him secure, General. And thank you, sir. But don't rough him up more than necessary. Admiral, if you will be so kind as to check, I think you will find two Marines and two Secret Service men just outside that door. Please ask one of them to telephone for two White House Police. I want this person removed from the building and not allowed back in. Nor back into the Pentagon, ever. Most especially not into his former office."

"A pleasure, Ma'am!"

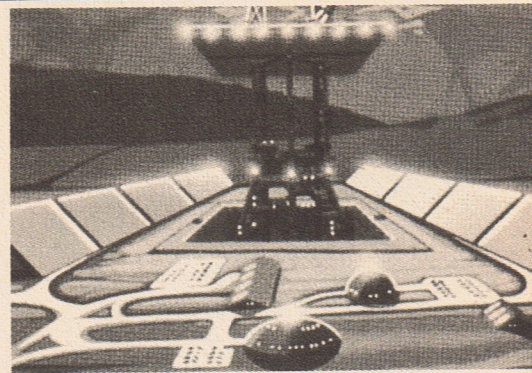
"Thank you, sir. I hope to see you all here at the same time a week from Thursday. General Smith, I ask you to remain chairman pro tem, in addition to your regular duties. Adjourn when it suits you. I'm withdrawing now; I want to lie down. I find that I am a bit shaky...."

CND 406CRH

CHEYENNE—LEGISLATURE BOTH HOUSES PASSED OVERWHELMINGLY FIRST AND SECOND READING EMERGENCY MEASURE RESTORING PAUPERS OATH FOR RECIPIENTS OF ANY PUBLIC ASSISTANCE OF ANY SORT REPEAT ANY SORT IN RESPONSE TO GOVERNOR'S IMPASSIONED CLAIM THAT THERE WOULD BE NO MONEY FOR THE BLIND AND THE TOTALLY HELPLESS UNLESS STATE RETURNED TO NINETEENTH CENTURY TEST OF ELIGIBILITY MORE MORE

CND409CRH

CHEYENNE—AMERICAN CIVIL LIB-



ERTIES UNION WILL FILE CLASS ACTION IN FEDERAL COURT TO STOP RESTORATION OF PAUPERS OATH AS PREREQUISITE FOR PUBLIC ASSISTANCE.

"Come in, Senator! Thank you for doing me this favor!"

"Madam President, it would be a pleasure to call on you at any time even if you were not President. Perhaps more."

"Uncle Sam, I don't know what that means but I like it. Now to work! Would it suit you to work for me?"

"You know it would, my dear—but I have a constituency."

"I don't mean resign and take a job here. But can't you pair votes, or something? I need a lot of help from you right now and more later."

"Anything the President wants, the President gets. Yes, I can always arrange a pair... even when I'm only nominally out of the District." He looked down at her. "Trouble?"

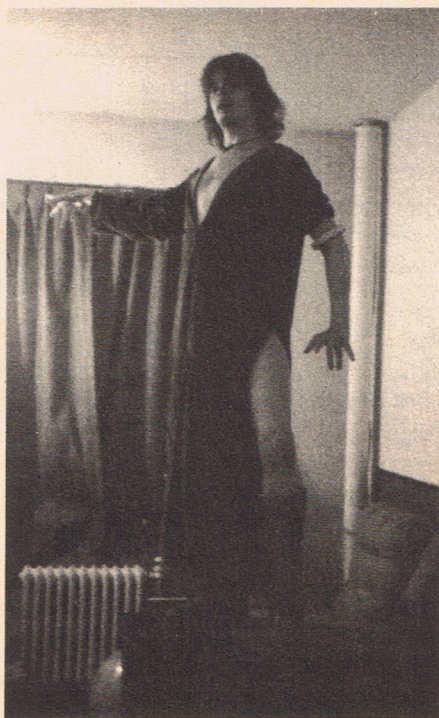
"Work I don't know how to handle. I've got to appoint 23 judges and I can't put it off much longer. And I don't know how to tell a knucklehead from an Oliver Wendell Holmes. See that tall stack? And that one? Those are the written opinions—or other legal writings if they are not already judges—from the candidates for judgeships. No names on them, and other identifications blacked out. Just identifications numbers. I thought I could read this mess and tell which

(continued on page 69)

• PORTFOLIO •

DAVID EGGE

...and his art of excelsiorealism



By RON MILLER

David Egge looks like an escapee from the stranger chapters of *Faeries*: blonde, slight and always with the expression of amazement that until now only cats would get as the invisible wonders of the world passed before them. He resembles his Viking forefathers more in the mythic approach he takes to his art than in his physical stature. To most established artists, Egge is appallingly young—only 23. He broke into the field of SF and astronomical illustration only a few years ago and his rise has been appropriately meteoric.

Egge has been working steadily for Ace, Berkley, Pocket Books and Random House as well as national magazines like *FUTURE LIFE*, *Starlog*, *Analog*, *Destinies*, *Omni*, *Astronomy*, among many others. Corporations such as Honeywell, Comsat, Control Data Corporation and Foundation Inc. have all used his art in their national advertising programs.

While Egge entered the genre of SF by way of his astronomical paintings, his brilliantly colored and meticulously detailed extraterrestrial landscapes are still what he is best known for. It was the beauty and accuracy of these that gained him a position among the stable of leading astronomical artists gathered by Carl Sagan to design and produce art for his *Cosmos* TV series (along with artist John Allison, whose work is featured in *FUTURE LIFE* #23). David's paintings were featured in the book *Cosmos* as well as on the forthcoming record album cover. He has already completed pre-production designs for Sagan's next project, *Contact*.

Have you had any formal art training?

No, but I learned some painting techniques from you, Ron. Early on, at an SF con (I was about 16), Rick Sternback told me to get an airbrush. 1973-77 was a pivotal point in my career. Much of my work was trial and error. Also, I studied the works of Ludek Pesek, and derived a sense of direction from his paintings, a focus for what I was trying to do. Recently, I've been discussing perspective theory and approach to picture-making with John Berkey, who lives near me. Basically, I've always been very visually oriented. I think that's one reason why some people become good artists; because they're visually oriented.

Are there any artists past or present who have been particularly influential to you?

Pesek, as I said before; Bonestell and Mel Hunter; but since I don't do just astronomicals for SF book covers, I'd also say Mike Whelan, Richard Corben, Darrel K. Sweet and John Berkey. When I was much younger I used to do water color paintings on religious themes, and I still enjoy the works of those Renaissance guys: Da Vinci, Raphael, Michelangelo, etc. Lately I've been mixing concepts from surrealists such as Magritte, Blake, Dali, Dore and Roger Dean.

What do you think are the strongest areas in your artwork? The weakest?

Composition, color, conceptualization, textured distance and atmosphere. I think I'm rather good at depth of field. (Even my optometrist, who was trained to make critical evaluations of stereovision, thinks so.) I not only try to make the objects in a painting, whether they be



First Contact—Mote in God's Eye

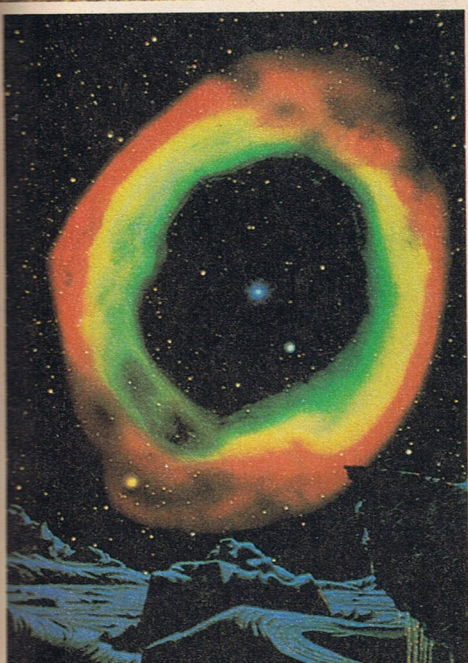
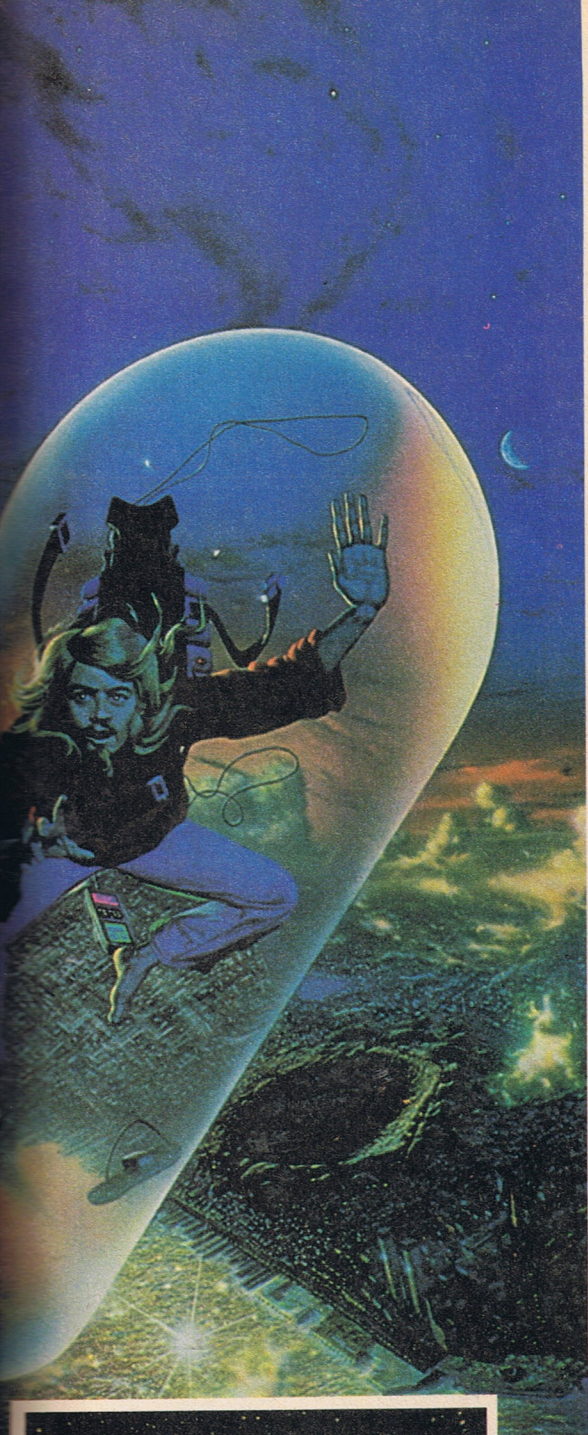
(From the book by Larry Niven and Jerry Pournelle. Says Egge: "My first truly successful figure painting.")



ALL ART: © 1981 DAVID EGGE



Shield



Ring Nebula in Lyra



Resurrection of Humanity



planets, landscapes, people or machinery, look as if they had correct light and shadow effects, but I also try to convey the sense of the space around these objects. Some other artists' paintings I've seen look so flat; it seems like you could step out of the spaceship in the immediate foreground and then hit your nose on the horizon.

The reproductions of my work are often disappointing. For instance, the laser-scan technique, which works great for photos, invariably shows up superfluous physical texture of the board or canvas (whether lit in contrast or not). Or when the work is cropped or overly enlarged, which can sometimes ruin the composition I planned so carefully, or when the piece is sundered by a blurb or always-clashing colors, like hot fluorescent orange letters against a deep blue sky.

What direction do you feel your art is taking? Is it in the direction you want it to go?

It's getting conceptually more weird; technically, more loosely tight [sic] than when I started out. Yes! But of course. But I'm still experimenting.

What sorts of science fiction do you enjoy? What sorts of SF do you most enjoy illustrating?

When I was young I read Clarke, Asimov, Niven (and the ever-popular Niven-Pournelle combination) and Greg Benford. Although it is not SF, Carl Sagan's *The Cosmic Connection* had a profound influence on me. Lately, I've gotten into Robert Sheckley and Carlos Castaneda, and I like the fantasy stories written by EssJay (she's the human I live with). Mostly, I like to come up with my own story ideas, and for the greatest part, I like to look at SF as a concept, not from any specific literary idea, but when the picture itself tells the story.

Do you think there is any real dichotomy between illustration and fine art?

Yes and no. True fine art you do for yourself; mainstream or fad art you do for galleries and churches. Illustrations are done for clients or patrons.

What personal projects are you working on? What would you like to be working on? Is there anything you'd like to do outside of SF?

Quite a few things. I've been requested (by me Mum) to paint a picture of our collective cats. I'm doing a number of paintings which I suppose could be labeled as surrealist in nature; however, they are simply my fantasies—which tend to take on a form of progressive perversity. I call it "excelsi-orealism," which is my own school of art and I am its only member. It's sort of like taking icons, pieces from different periods and styles of art, i.e. religious plus astronomical plus wildlife plus anatomical cut-away plus psychedelic plus cubist works, putting them into a jar and shaking vigorously; the contents are then flung onto the board. I'm currently working on collections of paintings and song-writing as well as epic-type poetry for a book project of mine called *Glow*. I'm usually happy with what I'm doing now, and I just play it by ear as to what I'll do. I'm very intuitive about that.

Within SF illustration, what particular elements do you most enjoy working with?

Perspective relationships, because I take a perverse delight in painting everything from the farthest galaxy to a person, to a bee, to a grain of sand—all in sharp focus in the same picture. That's something no camera can do.

What do you think is the most important factor in astronomical illustration? The least important?

Most important is perspective relationships, believability within the grounds of scientific understanding, and the painting should be lyrical. Least important is being too diagrammatical.

How important a place do you give scientific accuracy?

Again, if it's so accurate that it becomes a diagram, it's not fun to paint. The only thing I scientifically hold as religion is that all you see is light; therefore, that's all I wish to paint.

What media do you most enjoy working in?

I enjoy acrylics mostly, a bit of tempera or gouache, colored pencils; I've painted with oils, but not very much.

How much time do you spend on an average painting?

From one day to three months, depending on how elaborate or large the

piece is. While I *can* work fast, I tend to be more contemplative on some of the more strange and complex pieces. It varies a lot.

What non-art activities do you enjoy?

I listen to a lot of music. I like classical; I especially like Beethoven's Sixth Symphony, Bach, Grieg and pieces performed by Tomita. As for rock, I listen to Yes, Pink Floyd, Genesis, Jade Warrior, Vangelis, Eno, ELP, Rundgren, Led Zeppelin, Hendrix, the Beatles, and I especially like works by Jon Anderson. I like writing my own songs and singing; I want to do my own music. I also like to write stories, do sculpture; I've made animation models, amateur films and make-up for plays and amateur films. I like to play with my cat, ride my bike, walk my walk and go to the movies.


What are some techniques that you use that may be unique to you?

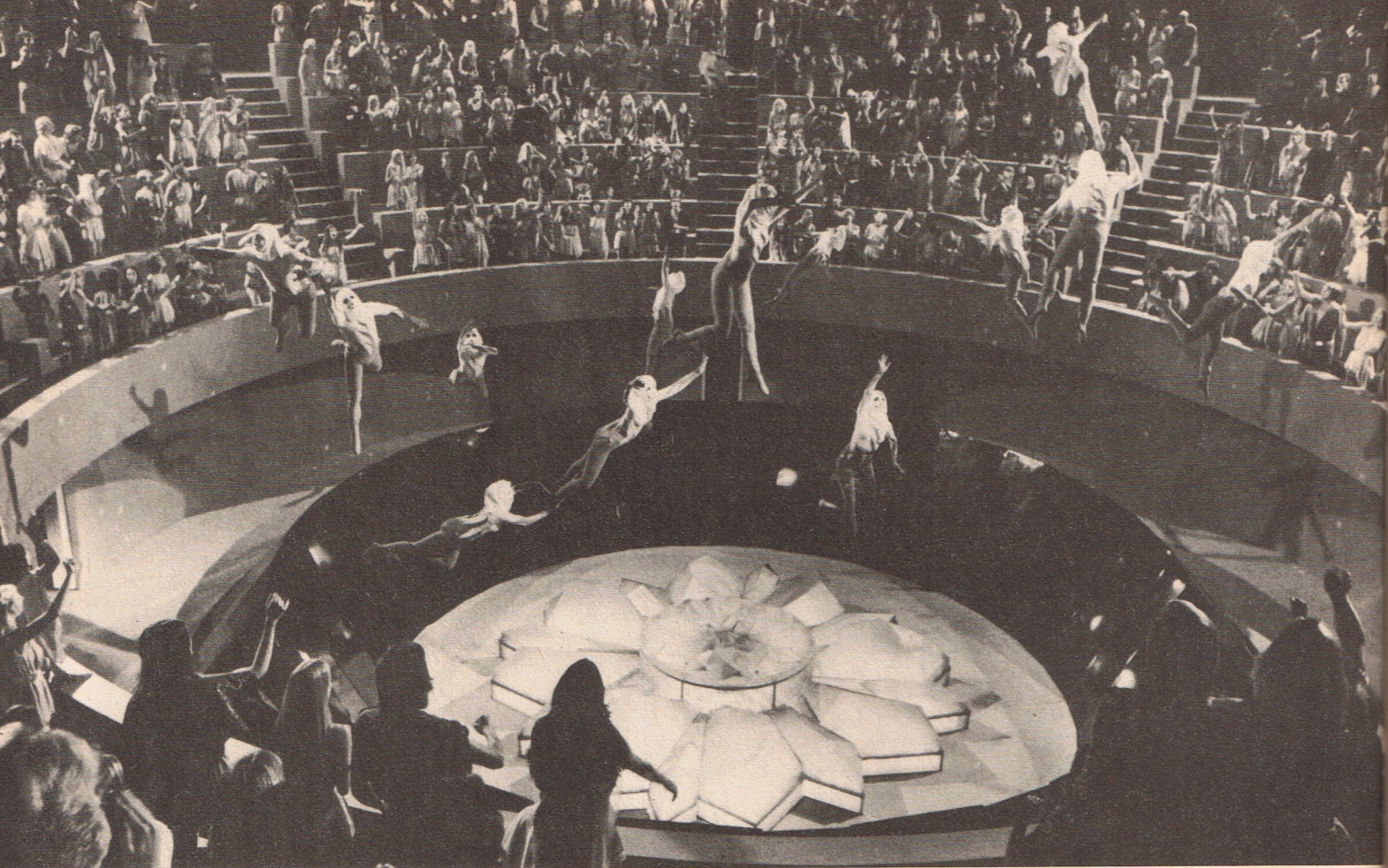
I paint with my fingers, mask with paper towels and masking tape (sometimes). I use an old, battered, worm-eaten T-square, but most importantly I sing and make synthesizer noises with my mouth and find that being patient and full of joy is the best situation while I'm painting.

Is there anything else you'd like to discuss?

For those of us who airbrush, I think it ought to be mentioned that a great deal of the paints we use which claim to be non-toxic are not telling the whole truth. Paints which list cadmium or cobalt or suchlike really *do* contain those substances! Phthalo blue even has cyanide in it; others contain PCB's. I exiled such colors from my airbrush palette a year or so ago, and I feel a lot better for it. There are a lot of fine, safe colors you can substitute; even food coloring. I feel that these look better and more natural than the nasty colors. For further information on this, check out a book entitled *Artist Beware*. I'm quite serious about this matter and hope that you'll heed my words. Otherwise, it's like Darwin, Jerry Pournelle, and Jeff C. Berry have said about natural selection. . . .

What do you want to be when you grow up?

I don't believe I want to grow up; I'll just remain a likeably dippy child prophet. 



Students today are becoming interested in studying about their possible tomorrows. Is this the classroom of the future?

Studying the Future

By ROBERT GREENBERGER

Summer vacation is beginning, and the only future you may want to think about is the next chance to hit the water and go swimming. If you're a student, probably the last things on your mind are the courses you're planning to take next fall or even the following spring. But if you're inclined to let your mind wander to what may await the world in future summers, perhaps now's a good time to give thought to courses that deal with our possible tomorrows.

For the past ten years, courses about the future have been popping up in junior and senior high schools and colleges around the world. At present count, there are over 250 courses preparing people to think about the future.

At the junior high level, teachers are trying to make young people aware of new technologies and how they will change and affect our lives. High school students are learning more about chang-

ing social and political values and how this has some bearing on their lives today. A high school in Jericho, New York, for instance, has offered future studies for several years, and last year began applying this knowledge by involving students in creative problem solving, focusing on the future of their community.

At the collegiate level, undergraduate students are studying a broad-based variety of programs encompassing economics, politics, social values and ecology. And there are now graduate courses available, complete with doctorate programs like the one at the American School of Management in Illinois. Their Future Oriented External Doctorate offers studies about management that are "dictated by student needs and interests."

To help supplement the basic material, some courses are taught by the team method, using teachers from different

disciplines to help present a more detailed overview of the subject matter. Other schools rely on field trips and guest speakers to help on specific points raised during the course. For example, students at the State University of California at Northridge have up to 22 different people from NASA come speak on a variety of topics, and the class takes field trips to the Jet Propulsion Laboratories and TRW, a computer company involved in advanced technologies. Other schools, without similar resources, ask local computer experts and political analysts to dramatize points.

Teaching the future is no easy job. Not only does the teacher have to explain what is going on today, but he or she must be able to guide the students into thinking about plausible changes and reactions to specific events, and then come to conclusions in the areas of politics, economics, social institutions, scientific research and whatever else comes to

mind. More so than in any other area, student participation is essential to make these courses work. They are also the only non-literature courses that have some form of dependence on science fiction as a teaching aid.

Noted science fiction writer and college professor Jack Williamson comments, "Futurology has developed into an independent academic discipline, but a sister discipline to science fiction. As you know, there's a World Future Society. In fact, there are many organizations, such as the L5 Society, devoted in some way to futurology."

Williamson and others note the variety of sources available for teaching a course of the future. Many teachers rely on Alvin Toffler's *Future Shock* and *Learning for Tomorrow*, or on Gerard K. O'Neill's *The High Frontier*. There are, in fact, literally hundreds of books teachers can choose from and almost all of them are used in one school or another. The courses also use current periodicals such as *The Futurist* and *Scientific American*. And then there are filmstrips and movies made available from organizations like the World Future Society. Some of these films come from PBS-produced shows like *Nova*, others are network documentaries and films produced by major corporations. Bell Laboratories, for example, offers a film on the research they are doing to help program computers to speak. Human values are represented by such programs as the ABC Marlo Thomas children's special of several years back, *Free to Be You and Me*.

And then there are the books. Not non-fiction works that discuss ecological or economic trends, but books of ideas. The same science fiction books that have been looking forward for decades. These include classics such as Walter Miller's *A Canticle for Leibowitz* and lesser known works like Roger Elwood's collection of *Six Science Fiction Plays*.

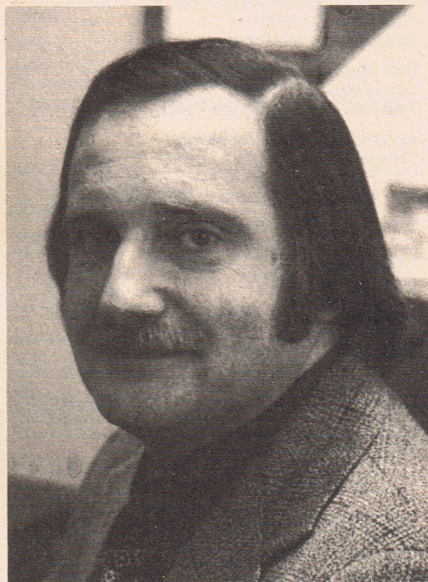
"There's a lot of overlap between them," Williamson says about science fiction and the future. "Many of the most stimulating and most convincing visions of future life have been offered through science fiction, and many of the courses in futurology use science fiction. A good example of those is the course Professor Dennis Livingston describes in the syllabus, 'Science Fiction taught as Futurology,' which he contributed to the book for science fiction teachers, *Teaching Science Fiction: Education for Tomorrow*, a collection of articles by various fine hands that I have edited for Owlswixk Press.

"I like to claim that the two disciplines

were pretty much sister creations of H.G. Wells. His early and great science fiction grew out of a very intelligent and imaginative interest in the future. His first novel, *The Time Machine*, published in 1895, was essentially a Darwinian projection of the future evolution of mankind. By 1902, in the lecture and book *The Discovery of the Future*, he was outlining the principles still basic to modern futurology.

"As I remark in *H.G. Wells: Critic of Progress* (Mirage Press, 1973), science fiction courses can be arranged along a spectrum that runs from fantasy to futurology. Some stress such literary elements as myth, style and character revelation; but more of them, I think, deal in some way with the impacts of technological change on future life."

A course representative of that viewpoint is taught by one of the most knowl-



Dr. W. Warren Wagar of SUNY-Binghamton

edgeable Wells scholars today. At the State University of New York at Binghamton, W. Warren Wagar has been teaching his course, History of the Future, since 1974. Offered through the history department, the course integrates science fiction novels, science fiction films and non-fiction works to hammer home the points raised in class lectures and discussions.

Wagar, born in 1932, received a Ph.D. in history from Yale. His doctoral thesis and first book was on H.G. Wells. Like Williamson, Wagar says of Wells, "Some say he's the founding father of future studies as an academic discipline. He managed to work this concern of his into his sociological and fiction books. He was a good topic for intellectual history too. He was a thinker with a wide and broad influence but is not represen-

tative of any one specific field of academic research."

After teaching at Wellsley and the University of New Mexico, Wagar arrived in Binghamton and began teaching history. The then-current chairman, Norman Cantor, was looking for new and interesting courses to stimulate both the teachers and the students. Wagar thought it would be a natural to teach a course using his interest in the future as the basis. His original plans were to teach a world survey course that would end with several weeks devoted to a look at where the world was headed and discuss possible futures.

"It occurred to me that all of my published work was on the future, and I was a member of the World Future Society almost since its inception. I had considerable personal interest in trying to figure out the history of the human race. Why not put together my personal and academic interests with a growing concern about the shape of the future and make a course out of it? The course just came together almost without any effort," Wagar says.

The course was offered first in the spring of 1974 and again in the fall of 1975. It was considered a hit and he has offered it almost every fall since. The number of participants has remained constant at 250, and it remains one of the more popular history courses for non-majors.

Wagar reflects on the course and the students after seven years: "I cannot say it has changed enormously. There has not been a fundamental reconception of the course but it certainly has changed in emphasis. The basic format remains the same. The readings have changed; I've changed some of the films. I've shifted a bit away from the review of world history that I did at first. I've started to de-emphasize the environmental part of the course. I think, perhaps, I was doing too much of that, too little analysis on institutions, in particular too little research on economic trends."

In the course description, Wagar writes that the world is headed for either Utopia, apocalypse or just plain muddling along. By course's end, after twice-weekly lectures, weekly discussion groups, nearly a dozen books read and almost as many films watched, students try to sum up a direction for the world. Wagar boils all the opinions down and observes that nearly one third of the class generally believes the world is headed for some turning point that will lead toward the apocalyptic images. Perhaps one half of the class "expects the present

trends will continue more or less indefinitely with continued struggle between the three worlds, continued problems of economic development of capitalism and socialism in the first and second worlds and other matters like the arms race and the search for energy sources." Finally there are "some, a much smaller number, who believe in some radical transformation for a utopian future." Wagar has noted a shift from the apocalyptic student viewpoint to the viewpoint of muddling through the next 50 years. This has come about as more people take a more pragmatic attitude towards their situation. He says this is one reason why more people are turning to education to learn vocational skills that can be more readily applied than can theoretical teachings.

And as America's interests have turned toward science, education and a concern for the tomorrow that is coming, the number of courses about the future has grown at a dramatic pace. Spurred by more and more magazines, television programs and movies about the future, there will probably be a greater demand for futuristic studies in academic circles—a greater demand to be taught how to look at today and reasonably predict tomorrow.

Now isn't that something to think about under the shade on a warm summer's day?

* * *

Listed by state, this guide tells you which colleges and universities in the U.S. are offering courses on the future as well as course titles. The material is culled from the World Future Society's *The Future: A Guide to Information Sources*.

ALABAMA

The University of Alabama
College of Education
P.O. Box Q
University, AL 35486
Futures Forecasting; Applied Forecasting

University of Alabama in Huntsville
Huntsville, AL 35807
The Sociology of the Future

ARIZONA

University of Arizona
Department of Political Science
Tucson, AZ 85721
World Order/Futurism

Phoenix College
3802 North 42nd Place
Phoenix, AZ 85108
Dimensions of the Future

Pima Community College
Downtown Campus
PO Box 5027
Tucson, AZ 85703
Futurism: A Psychological Perspective

Scottsdale Community College
9000 E. Chaparral Road
Scottsdale, AZ 85253
Dimensions of the Future; The Future of Arizona

ARKANSAS

University of Arkansas
GE 245 College of Education
Fayetteville, AK 72701
Educational Futurism

CALIFORNIA

California Polytechnic State University
San Luis Obispo, CA 93407
Future Studies

California State University, Dominguez Hills
Room G-225, S&BS Building
Dominguez Hills, CA 90747
Future Policies Studies (program)

California State University, Long Beach
1250 Bellflower Blvd.
Long Beach, CA 92660
Science Fiction and Speculative Fantasy

California State University, Los Angeles
5151 State University Drive
Los Angeles, CA 90032
Future Studies (program)

California State University, Northridge
Department of Sociology
Northridge, CA 91330
Update on Space

University of California, Berkeley
Berkeley, CA 94720
Urbanism and the Futures of Cities

University of California, Los Angeles
Los Angeles, CA 90024
Patterns of Problem Solving

Pomona College and Claremont Graduate School
Claremont, CA 91711
Public Policy and the Study of the Future

University of Redlands
1200 E. Colton Avenue
Redlands, CA 92373
Education in the Future

San Diego State University
San Diego, CA 92182
Technology and Human Values

University of San Francisco
University Center Main Lounge
San Francisco, CA 94107
The Age of Specialization (program)

San Jose State University
School of Education
Seventh and San Carlos Streets
San Jose, CA 95121
Future Studies; Advanced Future Studies

University of Southern California
Education, WPH 702h
Los Angeles, CA 90007
Future Studies in Curriculum and Instruction

Spontaneous Combustion
P.O. Box 4411
San Rafael, CA 94903
The Active Classroom

Stanford University
Box 5816
Stanford, CA 94305
Ethics of Development in a Global Environment

COLORADO

Internation Graduate School of Education
University Park Place
Parker, CO 80134
Center for Futuristic Studies (program)

University of Southern Colorado
2200 Bonforte Blvd.
Pueblo, CO 81001
English

CONNECTICUT

University of Bridgeport
Management Engineering Program
College of Engineering
220 University Avenue
Bridgeport, CT 06602
Technological Forecasting and Long Range Planning

University of Connecticut
Box U-83
Storrs, CT 06268
Futuristics and Secondary Education

Western Connecticut State College
181 White Street
Danbury, CT 06810
Introduction to Educational Futuristics

DISTRICT OF COLUMBIA

American University
School of Business
Washington, DC 20016
Master of Business Administration (program)

Antioch University
Institute for Alternative Futures
1624 Crescent Place, NW
Washington, DC 20009
Alternative Futures and the Policy Process

George Washington University
Washington, DC 20052
Technology Assessment; Futurism and Education; General Management Systems and Organizational Cybernetics

FLORIDA

Barry College
11300 NE Second Avenue
Miami, FL 33161
Future Aspects of Business

Central Florida Community College
PO Box 1388
Ocala, FL 32670
The Future

University of Florida
Philosophy Department ASB
Gainesville, FL 32611
Environmental Problems and Systems Philosophy

Florida Atlantic University
Boca Raton, FL 33432
Program in Business Innovation and Strategy

Florida State University
Art Education/Craft Design
EDU 123
Tallahassee, FL 32306
ATE Graduate Seminar

University of South Florida
College of Education
Tampa, FL 33620
Schools and the Future

University of West Florida
9 Mile Road
Pensacola, FL 32504
Language of Change: Futuristalk

GEORGIA

Atlanta University
Graduate School of Business Administration
Atlanta, GA 30314
Public Policy and Private Enterprise

Emory University
Atlanta, GA 30322
Religion, Change and the Future

University of Georgia
Aderhold Hall
Department of Educational Psychology
Athens, GA 30602
Future Problem Solving Program

HAWAII

East-West Center
1777 East-West Road
Honolulu, HA 96848
Transnational, Cooperative Problem-Oriented Research, Development and Learning Projects

University of Hawaii
Department of Political Science
2424 Maile Way
Honolulu, HA 96822
Alternative Futures Program

ILLINOIS

American School of Management
850 Exchange
Suite L-102
Park Forest South, IL 60466
Future Oriented External Doctorate (program)

Bradley University
Peoria, IL 61606
Geography of the U.S. in the Year 2000

DePaul University-School for New Learning
23 E. Jackson Blvd.
Chicago, IL 60604
Alternative Futures

Eastern Illinois University
School of Technology AAE 101
Charleston, IL 61920
M.S. in Technology (program)

Governors State University
Park Forest South, IL 60466
Technological Forecasting

North Park College
5125 N. Spaulding Avenue
Chicago, IL 60625
Our Children's World: Calamity or Hope?

INDIANA

Ball State University
Muncie, IN 47306
Colloquium on the Future

Indiana University
Bloomington, IN 47401
Educational Futures and the Curriculum

Purdue University at Indianapolis
925 W. Michigan Street
Indianapolis, IN 46202
The Future

School of Education
902 North Meridian
Indianapolis, IN 46204
The Implications of the Future for Educational Planning

Rose-Hulman Institute of Technology
5500 East Wabash Avenue
Terre Haute, IN 47803
Center for Technology Assessment and Policy Studies (program)

IOWA

University of Iowa
W 303 East Hall
Iowa City, IA 52242
Futurism in Education

University of North Iowa
Cedar Falls, IA 50613
The Present Predicament of Mankind

KANSAS

Fort Hays State University
Hays, KS 67601
Can Man Survive?

University of Kansas
Lawrence, KS 66045
Communications in the Future

Intensive English Institute on the Teaching of SF

LOUISIANA

Northwestern State University of Louisiana
Natchitoches, LA 71457
The Management of Change

MAINE

University of Maine
Shibles Hall
Orono, ME 04473
The Future in Education

MARYLAND

Catonsville Community College
Catonsville, MD 21228
The Future

Goucher College
Towson, MD 21204
Global Futures (program)

University of Maryland
College Park, MD 20742
Futuristics and Feeding Our People
Exploring our Future

MASSACHUSETTS

Cape Cod Community College
West Barnstable, MA 02630
Future Without Shock

Fitchburg State College
Fitchburg, MA 01420
Future Studies

University of Lowell
Department of Sociology, North Campus
Lowell, MA 01854
Futuristics (program)

Massachusetts Institute of Technology
50 Memorial Drive
Cambridge, MA 02139
System Dynamics (program)

University of Massachusetts
164 Hills House South
Amherst, MA 01003
Future Studies (program)

North Shore Community College
3 Essex Street
Beverly, MA 01915
Introduction to the Study of the Future

MICHIGAN

Andrews University
Berrien Springs, MI 49104
Education Planning and Revaluation
Long Range Planning

Central Michigan University
307 Ronan Hall
Mt. Pleasant, MI 48859
Educational Futurism, Professional Studies

Eastern Michigan University
Department of Political Science
Ypsilanti, MI 48197
Politics of the 21st Century

Oakland University
School of Education
Rochester, MI 48063
Politics in Education: Designing Educational Futures

Marygrove College
8425 W. McNichols Road
Detroit, MI 48161
The Year 2000: Promise or Peril

Michigan State University
Office of Medical Education
Research and Development
A206-A E. Fee Hall
E. Lansing, MI 48824
Social Context of Medicine (program)

University of Michigan
109 E. Madison
Ann Arbor, MI 48104
Computers in College Teaching and Scholarly Work

Western Michigan University
Kalamazoo, MI 49008
Humanistic Future Studies
Towards 2000: Utopian Visions and Futurism

MINNESOTA

Mesabi Community College
Virginia, MN 55792
Study of the Future

Metropolitan State University
Metro Square
7th and Robert
St. Paul, MN
Future Studies: An Overview

University of Minnesota
School of Nursing
3313 Powell Hall
500 Essex Street, SE
Minneapolis, MN 55455
The Future is Now

College of Education
203-F Burton Hall
Minneapolis, MN 55455
Concentration in Alternative Social and Educational Futures (program)

Moorhead State University
Moorhead, MN 56560
Sociology of the Future

St. Cloud State University
St. Cloud, MN 56301
Future Studies (program)

Department of Interdisciplinary Study
Stewart Hall
St. Cloud, MN 56301
Images of the Future

St. Olaf College
St. Olaf Avenue
Northfield, MN 55057
Exopsychology: The Human Factor in Long-Duration Space Flight and Space Settlement

College of St. Thomas
Cleveland and Summit
St. Paul, MN 55105
Current Decisions and Dimensions in the Discipline of Creativity

MISSISSIPPI

University of Mississippi
University, MS 38677
Administrative Perspectives of the Future of Education

MISSOURI

Institute for Education in Peace and Justice
2747 Rutger
St. Louis, MO 63104

University of Missouri
Boone County Extension Center

1407-1, I-70 Drive SW
Columbia, MO 65201
Increasing Citizen Participation Through the Delphi Technique

University of Missouri, Kansas City
School of Administration
5100 Rockhill Road
Kansas City, MO 64113
Policy and Planning (program)

St. Louis Community College at Forest Park
5600 Oakland Blvd.
St. Louis, MO 63105
Future Worlds

St. Louis University
221 N. Grand Blvd.
St. Louis, MO 63103
Future Studies (program)

Washington University
Graduate Institute of Education
Box 1183
St. Louis, MO 63130
Social Philosophy and Education: Alternative Social and Educational Futures

NEBRASKA

University of Nebraska, Omaha
Omaha, NE 68182
Futurism and Education: Learning for Tomorrow/The Role of the Future in Education

NEVADA

University of Nevada, Las Vegas
4505 Maryland Parkway
Las Vegas, NE 89145
Ecofiction

NEW JERSEY

Brookdale Community College
Lincroft, NJ 07738
Future Studies

Drew University
Madison, NJ 07940
Man's Future

Jersey City State College
Jersey City, NJ 07305
Future Society

Kean College of New Jersey
Morris Avenue
Union, NJ 07083
Program for the Study of the Future

Monmouth College
West Long Branch, NJ 07764
UniEd PALS

Rutgers University
Graduate School of Education
5th and Penn Streets
Camden, NJ 08102
Educational Theory (program)

Stevens Institute of Technology
Hoboken, NJ 07030
Problem Solving I and II

NEW YORK

Columbia University Teacher's College
New York, NY 10027
Schooling for the Future

Concordia College
171 White Plains Road
Bronxville, NY 10708
Futurology

New School for Social Research
66 West 12th Street
New York, NY 10011
Options for the Future

Niagara University
Department of Education
Niagara University, NY 14109
Education Futures for the 21st Century

Pace University
Political Studies Program
New York, NY 10038
21st Century

Polytechnic Institute of New York
Graduate School of Management
333 Jay Street
Brooklyn, NY 11201
Social Forecasting and Planning

State University of New York at Binghamton
Department of History
Binghamton, NY 13901
History of the Future

State University College at Buffalo
Chase Hall
1300 Elmwood Avenue
Buffalo, NY 14222
Interdisciplinary Center for Creative Studies (program)

State University College at Potsdam
School of Professional Studies
Pierrepont Avenue
Potsdam, NY 13676
Learning in the Future
Planning a Futures Curriculum

Syracuse University
School of Information Studies
113 Euclid Avenue
Syracuse, NY 13210
The Literature of Future Studies and Policy Studies

United States Military Academy
West Point, NY 10996
Political Philosophy

NORTH CAROLINA

Isothermal Community College
Box 804
Spindale, NC 28160
Visions of the Future

North Carolina State University
Division of University Studies
Raleigh, NC 27650
Alternative Futures
Technology Assessment

St. Andrews College
Laurinburg, NC 28352
A Look at the Future: Is Pessimism Necessary?

OHIO

Case Western Reserve University
Cleveland, OH 44106
Alternative Future for the Social Work Profession

Department of Anatomy
School of Medicine
Cleveland, OH 44106
Biological Problems of Man in Space

University of Cincinnati
College of Education
Cincinnati, OH 45221
Futures Studies in Education

Cleveland State University
Cleveland, OH 44115
Educational Futurism
University of Dayton
300 College Park Avenue
Dayton, OH 45469
Management Science (program)

Denison University
Granville, OH 43203
The Future as History

John Carroll University
University Heights, OH 44218
Futures: Past and Present

Kent State University
Kent, OH 44242
Business in the 21st Century

Wittenburg University
Springfield, OH 45501
Future Studies (program)

OKLAHOMA

University of Oklahoma
820 Van Fleet Oval
Norman, OK 73069
Futurology in Education

Department of Regional and City Planning
650 Parrington Oval
Norman, OK 73019
Future Study: Methods and Theories

OREGON

Marylhurst Education Center
Marylhurst, OR 97036
Humanities Seminar—1999: A Futures Exploration

Portland State University
PO Box 751
Portland, OR 97207
Future Society
Special Change and the Future of the City
Systems Science Doctoral Program

PENNSYLVANIA

Lehigh University
Bethlehem, PA 18015
Humanities Perspectives on Technology (program)

Marywood College
2300 Adams Avenue
Scranton, PA 18509
Utopias: Paths to Nowhere

Pennsylvania State University
Human Development Building S-210
University Park, PA 16802
Community Systems Planning and Development

Slippery Rock State College
Slippery Rock, PA 16057
Philosophy and Alternative Futures

Temple University
College of Education
Ritter Hall 470
Philadelphia, PA 19122
Perspectives on Tomorrow
Teaching for LIFE (program)

RHODE ISLAND

Providence College
Physics Department
Providence, RI 02918
Science and the Future

SOUTH CAROLINA

Coastal Carolina College
University of South Carolina
Conway, SC 29526
Careers in Education

Furman University
Grenville, SC 29613
Sociology of the Future

University of South Carolina
Department of Government and International Studies
Columbia, SC 29208
The Future of Politics

SOUTH DAKOTA

Dakota Wesleyan University
Mitchell, SD 57301
Choosing Futures

TEXAS

Austin College
900 North Grand Avenue
PO Box 1601 AC
Sherman, TX 75090
Sociology of the Future

East Texas State University
Commerce, TX 75428
Shaping the Future

University of Houston at Clear Lake City
2700 Bay Area Blvd.
Houston, TX 77058
Master of Arts or Science in Education: Concentration in Future Studies
Studies of the Future

Our Lady of the Lake University
411 SW 24th
San Antonio, TX 78285
Future Worlds

Rice University
Department of Religious Studies
PO Box 1892
Houston, TX 77001
Futurology and Religion

Texas A&M University
College Station, TX 77843
Alternative Architecture

University of Texas at Arlington
Department of English
UT Arlington
Arlington, TX 76019
Build Your Own Utopia

University of Texas at Austin
Program in Community College Education
Ed. B. 348
Austin, TX 78703
Community College Leadership Program

UTAH

Brigham Young University
Department of Spanish and Portuguese
Provo, UT 84602
The Media in Foreign Language Education

Utah State University
College of Education
UMC 28
Logan, UT 84322
Future of Education

University of Utah
Department of Sociology
310 Behavioral Science Building
Salt Lake City, UT 84112
Sociology of the Future

VERMONT

Marlboro College
Marlboro, VT 05344
Alternative World Futures: Decentralization, World Order and Limits to Growth

University of Vermont
College of Education and Social Services
Organization and Human Resource Development Area
228 Waterman Building
Burlington, VT 05401
Seminar in Futurism and Planning

VIRGINIA

Mary Baldwin College
Staunton, VA 24401
Technology and the Future
Science Fiction as History

Old Dominion University
Norfolk, VA 23508
Technology and the Future of Man

University of Richmond
Richmond, VA 23173
Future Policy: Anticipating 2000

Virginia Commonwealth University
Richmond, VA 23220
Education and the Future
Introduction to the Study of the Future

WASHINGTON

Central Washington State College
Ellensburg, WA 98926
Educational Futurism

University of Puget Sound
2122 MacArthur Street West
Tacoma, WA 98416
Forecasting and Planning

WEST VIRGINIA

Davis and Elkins College
Elkins, WV 26241
The Future

West Virginia University
Suite 609 Allen Hall
Morgantown, WV 26506
Appropriate Technology
Public Administration (program)

WISCONSIN

Mount Mary College
2900 N. Menomonee River Parkway
Milwaukee, WI 53222
Multi-Disciplinary Honors Seminar: Future Studies

Northland College
Ashland, WI 54806
Exploring Alternative Futures

University of Wisconsin Center, Barron Co.
Futurology

University of Wisconsin, Milwaukee
Urban Affairs Department-Bolton Hall
Milwaukee, WI 53211
Alternative Urban Studies

University of Wisconsin, Oshkosh
Algoma Blvd.
Oshkosh, WI 54901
Seminar: Futurism in Curriculum and Instruction
Telecommunications and the Future

University of Wisconsin, Stevens Point
Stevens Point, WI 54481
Futures

University of Wisconsin, Stout
Menomonie, WI 54751
Center for Futures Study (program)
University of Wisconsin, Superior
Superior, WI 54880
Hells and Heavens in Selected Science Fiction

(continued from page 57)

ones had their heads screwed on tight. I can't I don't understand legalese, I'm not a lawyer."

"I'm not a lawyer either, bright eyes."

"No, but you're the world's leading semanticist. I figured that, if you couldn't understand something, then it was really nonsense."

"It's a good approach. If a person of normal intelligence, and a reasonably full education, cannot understand a piece of prose, then it is gibberish. But you shouldn't be doing it; you have a country to worry about. I don't have time, either, but I'll take time; my staff are quite competent to wipe the noses and hold the hands of my constituents for a while. I'll arrange it."

"Then you'll do it! Uncle Sam, you're a dear!"

"But I want a bribe."

"You do? I thought I was supposed to be offered bribes, not have to pay them."

"I'm eccentric. I take bribes only from pretty little girls I've known a long time."

"You're eccentric, all right. What is that thing you wear on your head? A cow pat?"

"My dear, you're colorblind. Madam President, I want you to sponsor . . . and by great good luck I just happen to have a copy of it on me."

"I'll bet you sleep with a copy of it on you. No, just put it on the desk. Now tell me what it is supposed to accomplish."

"It permits a citizen to challenge the Constitutionality of any law or regulation, Federal or any lesser authority, on the grounds that it is ambivalent, equivocal, or cannot be understood by a person of average intelligence. Paragraph three defines and limits the tests that may be used to test the challenged law. The fourth paragraph excludes law students, law school graduates, lawyers, judges, and uncertified j.p.'s from being test subjects. I call it 'the Semantic Amendment.'"

"No, you don't; you call it 'the Plain English Amendment. Show biz, Uncle Sam. Senator, under this amendment could a person challenge the income tax on the grounds that he has to hire an expert to make out his form 1040?"

"He certainly could. And he would win, too, as no three I.R.S. men can get the same answers out of identical data if the picture is at all complex."

"Hmmm— What if he's bright enough but can't read?"

"Paragraph three."

"How about the Federal Budget? It isn't law in the usual meaning but Congress votes on it and it has the force of law, where it applies."

"First paragraph. It quacks like a duck, waddles like a duck—it's a duck."

"I'll try to study this before I fall asleep tonight. Senator, this one we're going to put over!"

"Don't be too certain, Madam President."

Lawyers are going to hate this . . . and the Congress and all the state legislatures have a majority of lawyers."

"And every one of them not anxious to lose his job. That's their weakness . . . because it's awfully easy to work up hate against lawyers. Senator, this bill will be introduced by lawyers. Both houses. Both parties. Not by you, you're not a lawyer. Uncle Sam, I'm an amateur President but I'm a pro in show biz. It'll play in Paducah."

* * *

The two Presidents were seated alone at the front of the crowded grandstand. Two kilometers in front of them a spaceship, small compared with the shuttle alone, stood upright in the bright Mexican mountain sunshine. A voice from everywhere was counting: "—sixty-one seconds . . . one minute . . . fifty-nine . . . fifty-eight—"

She said, "How are you coming with Spanglish, Señor el Presidente?"

He shrugged and smiled, "As before, Doña la Presidenta. I know it is simple; I hear your people and ours talking in it . . . and I understand them. But I don't have time to study. When I leave office—" He spread his hands.

"I know. Perhaps two years from now—I can't believe I've been in office only six years. It feels like 60."

"You've accomplished 60 years of statecraft; the whole world is awestruck."

"—forty-one . . . forty . . . thirty-nine—"

"There never was anything really seriously wrong with my country, Mr. President. We made some silly mistakes, then compounded them by being stubborn. The Fence, for example. What's the point in a Fence that doesn't work? So I had it torn down."

"Madam, your most creative act of statesmanship! Without that act of faith, you and I could never have put over our Treaty of Mutual Assistance. And the dozen major advances we have started under it. This. You and I would not be sitting here."

"Yes. No more wetbacks and *this*. Mr. President, I *still* don't understand how a beam of light can put a spaceship into orbit."

"Neither do I, Madam President, neither do I. But I believe your engineers."

"So do I but it frightens me."

"—fifteen . . . The Binational Solar Power Zone is now on standby power . . . nine . . . eight—"

"Oh! Will you hold my hand? Please!"

"—four! . . . three! . . . two! . . . one! . . ."

LIGHT!"

A single inhalation by thousands, then came the everywhere voice in soft, reverent tones: "Look at that bastard go!"

* * *

"—direct from O'Neill Village, Ell-Five. It's a beautiful day here, it's *always* a beautiful day here. But today is our happiest fiesta ever; little Ariel Henson Jones, first baby born in space, is one year old today. All four of her grandparents are here, her father's

parents having traveled all the way from Over-the-Rainbow, Ell-Four, via Luna City Complex, just to be here on this great day. Don't repeat this but a little bird, a parrot, told me that one of Ariel's grandmothers is pregnant again. I won't say which one but it's *personal* good news for *all* of us here in the sky because, if true and I can assure you it is, it is one more and very important datum in the rapidly growing list to show that youthfulness in all ways is markedly extended simply by living in free-fall. Correction: the mild acceleration we experience at the skin of our Village . . . but which we can leave behind completely at any time for free-fall sports at the axis.

"And *you* can enjoy them, too. This newscast comes to you sponsored by O'Neill Village Chamber of Commerce. Visitors welcome. You haven't *lived* until you ride the Light Beam, the cheapest way to travel per thousand kilometers ever invented by a factor of at least 100 . . . and not uncomfortable even the first few seconds since the installation of the new total-support hydraulic couches. Also you haven't lived until you've seen our free-fall ballet! You think Las Vegas has shows? Wait till you see a Coriolis torch dance. Or what free-fall does for a hundred-centimeter bust. Oh, boy! Or if you like to gamble we'll take your money with brand-new games as happily as Monte Carlo or Atlantic City. See your travel agent for a variety of package vacations.

"Or more than a vacation. Buying a share in the Village is cheaper than buying a house in most cities down heavyside. But if you are young and healthy and possess certain needed skills your migration into the sky can be subsidized. Phone the placement office here for details, same rates as from San Francisco to New York. Wups! Almost forgot to tell you: knowledge of industrial Spanglish required, plus some Brownie points for any other language you know . . ."

* * *

It *could* be that way, over the Rainbow. As Madam President said, there never has been anything incurably wrong with our country and our world—just a horrid accumulation of silly mistakes that could be corrected with horse sense and the will to do it.

We have a lot of healthy, intelligent people with a wide spread of useful skills, trades and professions. We have a wonderful big country not yet too crowded and still wealthy in real wealth, will and work. Actually it's easier to be happy and get rich than it is to go down the chute. This country has so much going for it that it takes a lot of work combined with wrong-headed stubbornness to ruin this country. It's not easy.

* * *

In the meantime don't go away. There are still a lot of sacred cows I haven't kicked but plan to . . . someday. So, unless I'm hit by a taxicab while swiveling on my cane to ogle pretty girls, I'll be back.

☐

Computer Graphics

Jim Hoffman is waging a war against the tyranny of machine intelligence by using computers to create spectacular works of humanistic art.

Does technology carry an inherent threat of profound dehumanization? Are we humans fated to be cast in a role of subservience to our machines? Will we cower as the dominant ethic of "speed" and "efficiency" that computers have made possible boomerangs on us, and rides tyrannically over our desire to live life on a basic human scale?

Or will we somehow manage to put creativity and humanist values back in the driver's seat? Can we check the encroachments of the computer into areas of human life and behavior where it has no proper business; and, above all, can we put an end to a subtle pressure toward ever-rising functionalism in human transactions—where speed and efficiency may not be the most appropriate values at all?

Jim Hoffman thinks we can. And he's out to draw the charts to show us how.

What you see in the accompanying color images is the work of a gifted young artist who is radically re-thinking the relationship of the human mind to the "mind" of the computer. By involving profoundly humanist values whose roots lie partly in structural mathemat-

By DAVE BEAUVAIS

ics, partly in formal aesthetics, partly in cultural history and partly in mythic (even Platonic) archetypes, Hoffman is waging a brilliant campaign against the developing tyranny of machine intelligence over our embodied human version.

Along the way, his campaign has managed to create individual moments of art which dazzle the eye, and beckon the mind to a firmer, fuller grasp of systemic principles involved in the expression of a moment of great beauty. He calls it "visual music." The analogy couldn't be better.

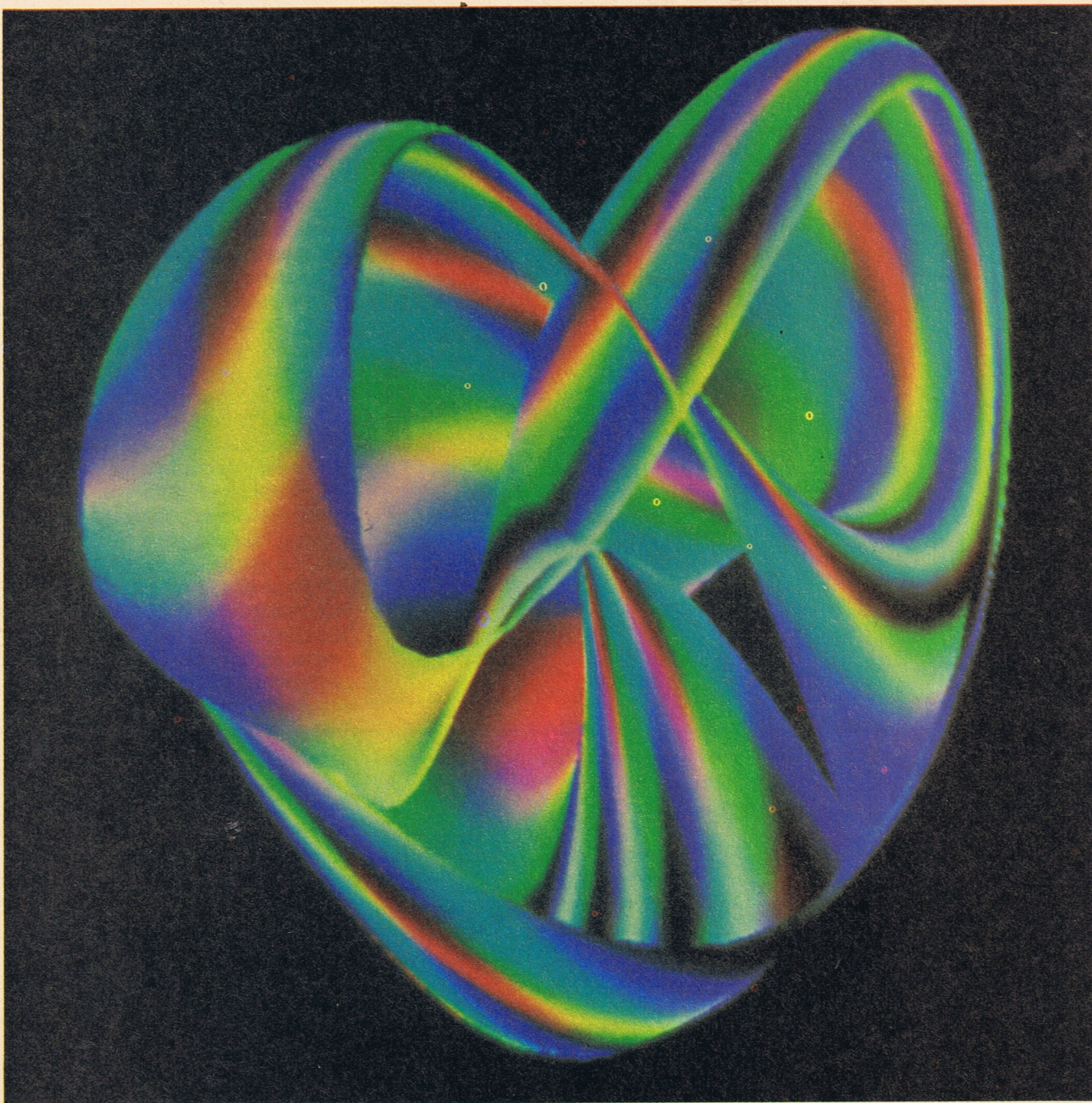
And if he can't show you how to stop Ma Bell's billing computer from dunning you again and again for a five dollar service charge you paid off many months ago (with each new dunning, of course, demanding higher and higher interest penalties), what he *can* show you is how to fight back existentially; by taking command of your rightful human intelligence, which should never have yielded its glories to a piece of dumb hardware in the first place.

Hoffman did his undergraduate work

at Florida State University, where his longstanding interests in art and mathematics coalesced into a clear vision of the possibilities of the computer graphic medium. Lacking adequate hardware and software support, Hoffman used the time to enrich his art background, majoring in visual arts while learning computers in his spare time.

Blessed with a protean intelligence and a good command of various mathematical languages, he mastered complex program design in short order. (Even today he adds new programming languages to his working repertory with the appetite of a gourmand.) But it wasn't until a year ago that he gained access to the color graphics system at the University of Massachusetts' Computer and Information Sciences Department.

More than anything else, what leaps immediately from his work is the soaring, articulate, tremendously lucid and bright intelligence of its concrete visual poetry. Each piece looks as though someone had taken a field of high-order equations, plotted their graphic paradoxes and abstract symmetries, left room for aleatory variations within the representational curves, and painted a



living mandala of that purely noetic instant—a sort of eternal truth dug from beneath the mutable surface of physical space and time.

In some of his plates, Hoffman has actually discovered—or re-created—the hidden mathematical subtext of a very late Mondrian work. Even more startling are the design parameters which—under his careful thinking and computer-assisted refinement of scale—produce a direct organic display of Persian Sufi rug designs and complex mandalas virtually indistinguishable from those painted by Tibetan lamas for use in powerful tantric meditation exercises.

Platonic archetypes indeed! For here, without a doubt, is the missing link be-

tween Hoffman's modern work, and the highly refined archaic intelligence that now stands threatened by a ruthless misapplication of technical "efficiency" to human values. When we start to use machine functions as role-models for human behavior; start to allow computers to "tell us" which human needs and visions must be sacrificed to maximize corporate profits; start to assess human beings by their ability to "perform" at high levels of linear efficiency, and make this efficiency the basis for valuing or rejecting (or exterminating) entire third-world cultures—then we have ruptured the sacred web of human intelligence that binds the vision of a Tibetan lama, or a Persian mystic, to our own innate

intelligence.

By rediscovering, in a language of almost intuitive mathematics, the very identical patterns, forms and structures that were expressed in the artistic visions of ancient cultures (whose traditions continue unbroken to the present, though under fierce attack from a violent imposition of the Western-corporate-bourgeois—"business" mind as the only "viable" model of reality), Hoffman has given new inspiration, and new conviction, to those of us who believe that humanity is One Family, One Intelligence, One Heart.

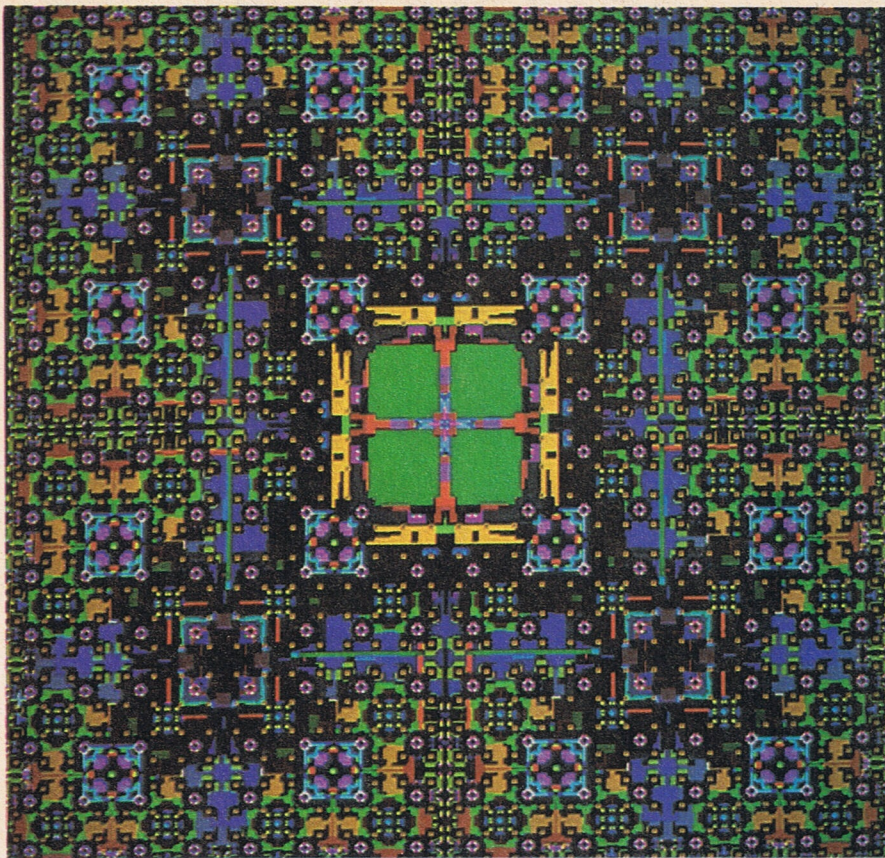
Design is a two-way street for Hoffman. Sometimes he'll get an interesting mathematical idea, sit down to write a

plot for it, and then realize it on the color graphics terminal of the university's interactive Grinnell computer system, from which all of these plates were taken.

At other times, he'll see an interesting shape in the "real" world and (from long practice) will have an immediate, almost mystical sense of its governing mathematics. Then he'll try to replicate it on the terminal, introducing variations and plotting changes to incorporate affective as well as purely architectural values, until he gets something he "likes."

An unmapped frontier so far is the enticing interface of abstract mathematics with very humanly accessible, warmly affectionate erotic forms. He's not sure if mathematical clarity can shed any new light on the ambiguities of eros, but Hoffman is already looking toward the creation of feature-length computer-graphics movies, in which these juicy ideas are bound to get a full airing. Something, after all, has got to build an audience's interest and hold his "plot" line together.

What else lies in the future? At the moment, Hoffman is working on a



ART © 1981 JIM HOFFMAN

Creating Computer Art

By JIM HOFFMAN

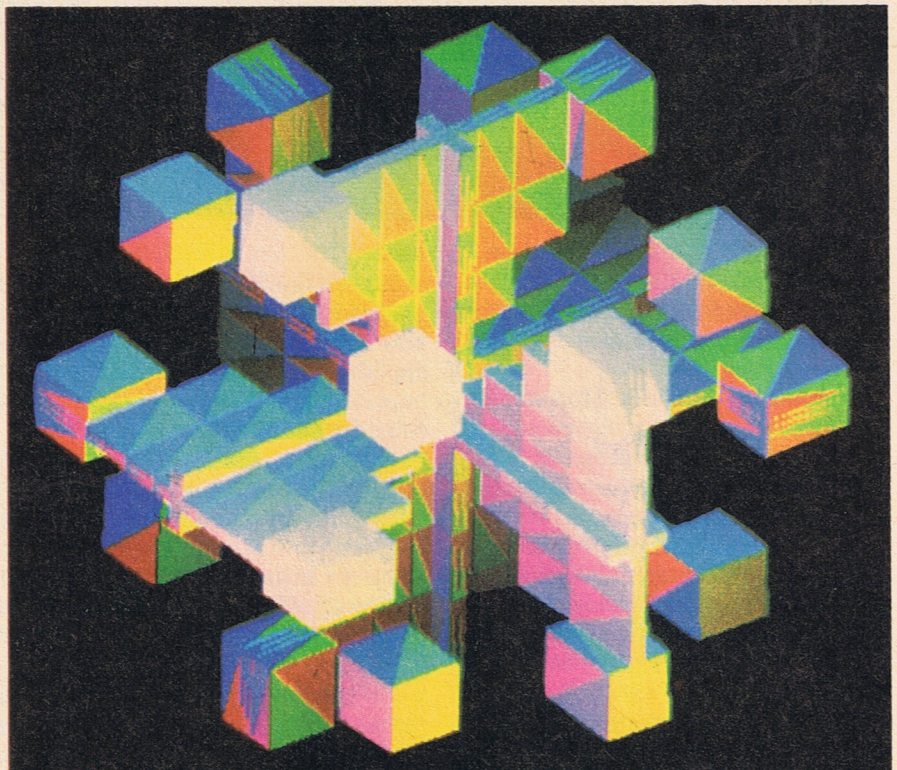
Computer graphics is the use of programmable computers to produce images on output devices such as color video screens. There are many reasons why computer graphics has great potential as an interactive medium, most stemming from the versatility of programs, the speed at which they may be executed and the ability of images to convey information.

Humans are highly visual animals. Our visual system consists of hundreds of millions of parallel channels. The ability of the mind to make sense out of this plethora of information is a feat only marginally understood. I suggest that whereas most people depend on their audio sense, more than their visual sense, for aesthetic enjoyment in the form of music, this has been due to the lack of a time-dynamic visual medium. Computer graphics might be used to evoke the deepest sense of beauty—that realm which has been the exclusive province of the gifted visionary—in people

who are accustomed to thinking of vision as the merely functional sense.

Whereas computers are well suited to synthesizing images, and humans are endowed with the ability to perceive and understand images, both fail miserably in the reversed roles. Computer graphics

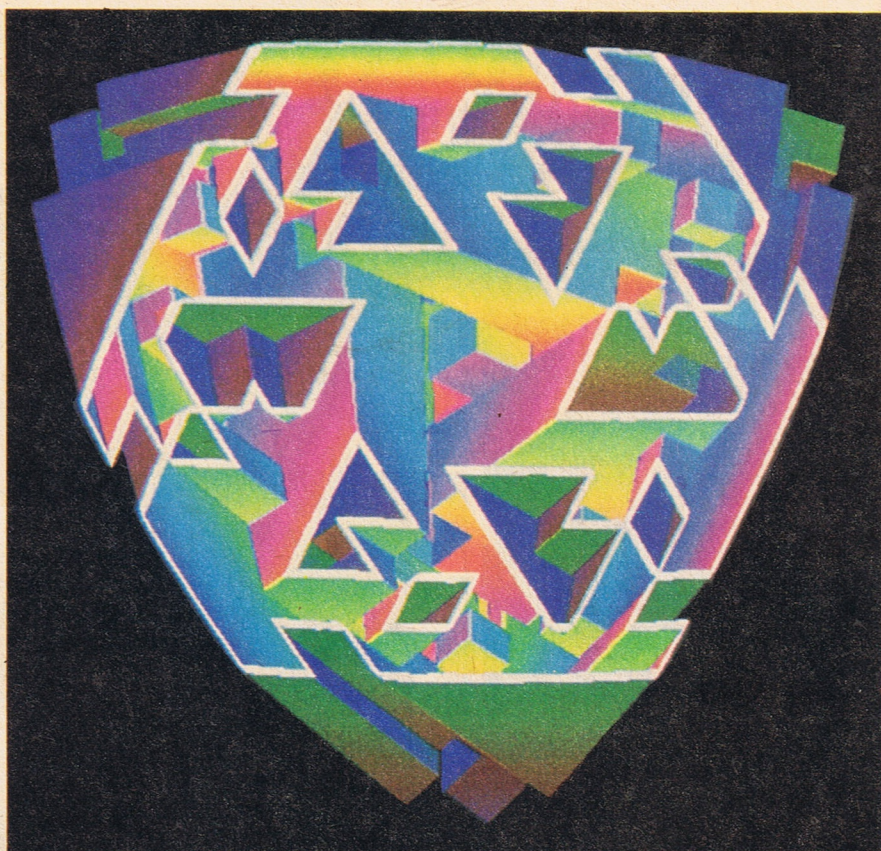
therefore provides the necessary complement to our innate biological equipment for realizing the full potential of vision as a medium of communication, education and art. Such developments could be of greater importance in the cultural evolution of our species than the



comprehensive master program (in PASCAL language) which will incorporate all of the subroutines required to generate any multi-dimensional graphic from its underlying mathematical architecture. It's the necessary first step before proceeding to moving-frame animation, which—as the artist envisions it, and unlike the non-rigorous “videosynthesizer” or “fingerpainting” approach to special effects seen in movies like *Star Wars* and *2001*—will retain a complete lucidity of mathematical intent and architecture at each step of the way.

On another (but fiscally symbiotic) front, Hoffman is also sweating out the licensing of a new invention, for which he is (with an engineering partner) co-holder of a fundamental patent. It's a gas-fired piston gun used to drive nails into concrete; and it promises to completely replace the present technology, which utilizes non-renewable gunpowder-type cartridges.

And just what does Jim Hoffman—inventor, mathematical wizard, computer genius, authentic 20th-century renaissance man—plan to do with his piece of the proceeds? “I think I'll buy myself a new computer!” he smiles. ▢

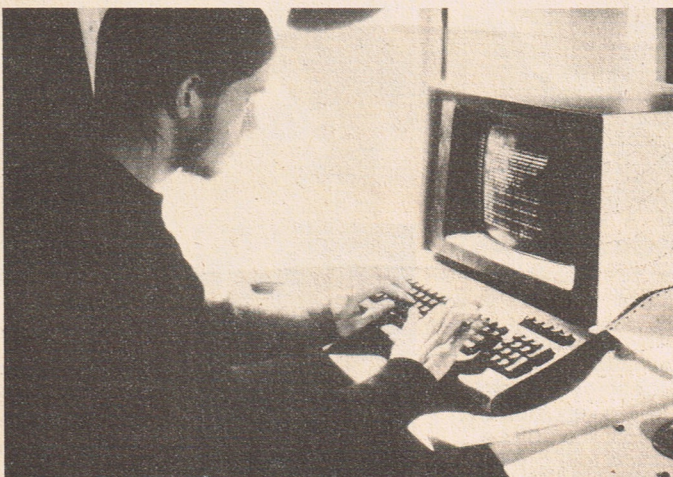


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invention of language or the printing press.

One of the central themes of art is the interplay of spontaneity and order. Although computers are often thought of as epitomizing order to the exclusion of spontaneity, their great speed and rigor in fact creates new possibilities for the exploration of spontaneity, which always exists relative to some framework or structure.

A basic understanding of the processes involved in generating these images should clarify this point. The entire process is controlled by a program, a sort of recipe which directs the computer to do arithmetic, make logical decisions, remember or recall things and talk to its peripherals—such as the video screen. The program begins by constructing a description of a grid curving through three-dimensional space. (Actually the computer can “think” in as many dimensions as the programmer chooses to make it.) The surface can then be rotated, shrunk, stretched, sliced, etc., and any of a number of schemes or systems used to color it. Finally, the three-dimensional description is projected to make a two-dimensional description suitable for “painting” on the screen. The specific forms these operations take is controlled by a set of input parameters given the program when it is run.



Computer artist Jim Hoffman: “Computer graphics might be used to evoke the deepest sense of beauty in people who are accustomed to thinking of vision as the merely functional sense.”

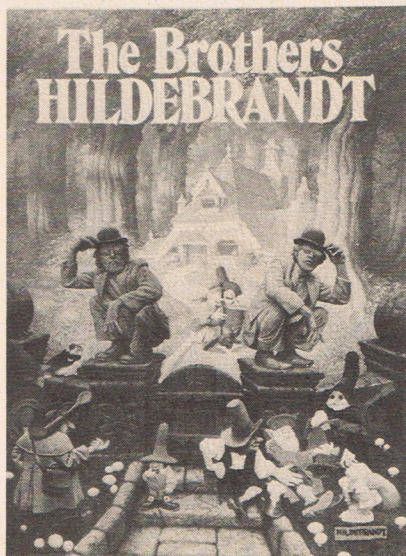
The computer artist thus has at his disposal a set of tools by which the global properties of an image can be immediately changed on a single command (input). This contrasts with the conventional artist's use of paintbrushes and pencils to create an image in a gradual set of incremental steps.

Herein lies the importance of computer graphics for extending the creative and imaginative powers of the human mind. By automating the rote processes involved in physically constructing an image, the computer frees the artist to deal with issues of image structure and meaning on a much higher level. A program can provide a framework of per-

ceptable structure on which endless permutations and transformations can be performed.

The illustrations which accompany this article were made from a program in which the user interactively controls certain parameters of a rapidly changing form. While the program provides an underlying symmetry of the forms, the user determines the size and color of the forms. Thus an *a priori* aesthetic framework or order is made to evolve in the direction of the user's liking. Programs such as this one could bring participation in art to the populace, it being much easier to recognize and interact with art than to produce it. ▢

HILDEBRANDT ART BOOK



For years, Tim and Greg Hildebrandt have been delighting fans with their exquisitely whimsical depictions of fantastic characters in faraway places. In 1978 the Hildebrandts held an exhibition of their works at the Maryland Funnybook Festival. In honor of this spectacular show *THE BROTHERS HILDEBRANDT—A BOOK ABOUT THE ARTISTS* was published.

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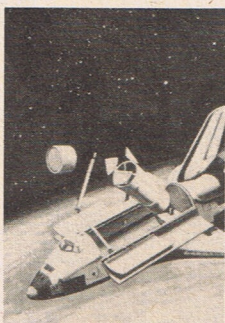
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next issue



HEAVY METAL

From the folks who give you the adult fantasy/comic magazine comes the *Heavy Metal Movie*, an eight-part animated project to be released this August by Columbia Pictures. Among the octet of tales, most of which originally appeared in the pages of the magazine, are two penned by *Alien* writer/director Dan O'Bannon. Rock music fans should note the 14 original tunes scored for the film, and performed by such premier groups as The Who, Devo, Tom Petty, Black Sabbath and Blue Oyster Cult.



SPACE TELESCOPE

One of the more promising future missions for the tried-and-true space shuttle program will be a payload known as the Space Telescope. This super-powerful "eye in the sky" is slated to be launched into its star-gazing orbit from one of the shuttles in 1985, and thus become part of an international effort to gain new, close-up knowledge of the so-far-unseen regions of the universe. Devoid of atmospheric interference, the space telescope will give an unhindered glance at such phenomenon as quasars and black holes, and seek out possible new planets.



CREATIONISTS

It seems that the Scopes trial did not settle the question—as the battle lines between evolutionists and creationists have again been drawn. The arguments are pretty much the same; it's mostly the names, language and tactics that have changed. Barbara Krasnoff will wade through the syllogistics in *FUTURE LIFE's* inspection of the origin of our species. And we'll provide the latest box scores from the various courtroom battles over who, or what, begat us.



TAKE STOCK IN THE FUTURE

Who'd have figured a decade ago that some of the hottest investments on today's stock market are in firms involved in such science fiction-esque endeavors as cloning, robotics and computers? Wall Street has seen the future and it looks profitable. High tech has turned blue chip with big money being laid down in futuristic markets like video, genetic engineering, communications satellites and energy-efficient architecture. We'll analyze the boom, identify some of the fastest movers and shakers and provide some helpful hints for investing in the future.

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Robert Anton Wilson talks about secrets and conspiracies in a frank interview. . . Mars also reveals some secrets by way of a series of revealing new photos from the Viking probe. . . Joe Haldeman formulates a political utopia in his Tomorrow column. . . Harlan Ellison finishes off the Moral Majority, and goes to the movies to comment on the current spate of knife-kill flicks. . . and, of course, our regular columns will keep you informed about music, books, ecology, space exploration, art and all the news that's affecting life in the future.

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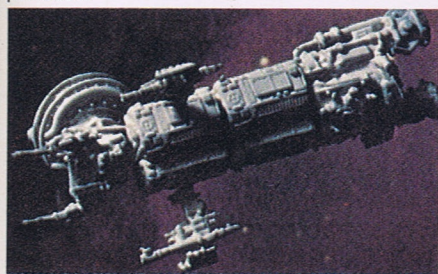
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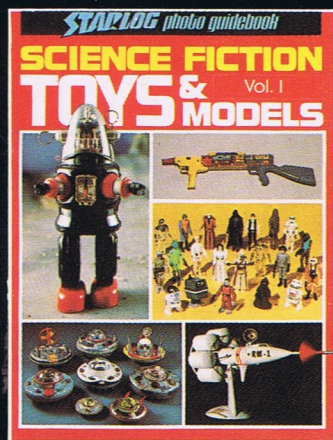
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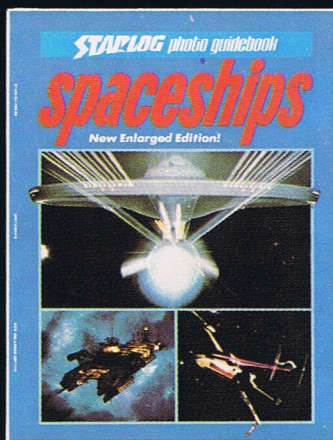
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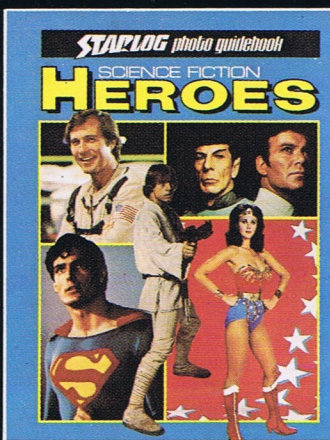
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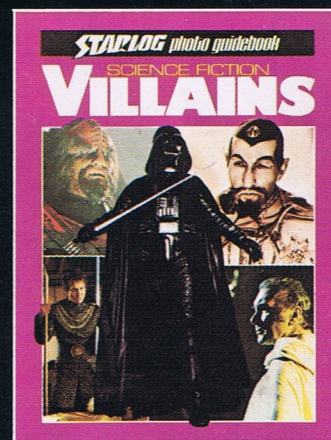
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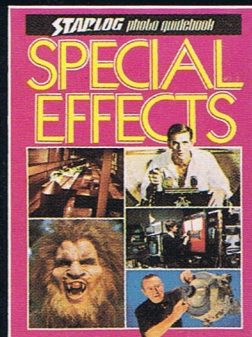


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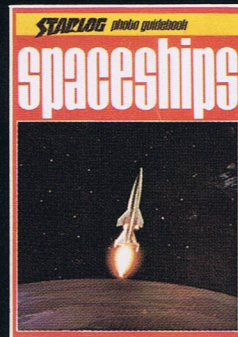
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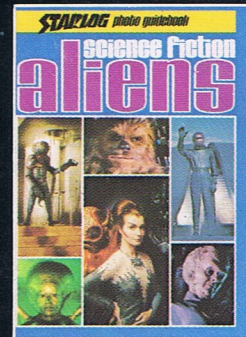
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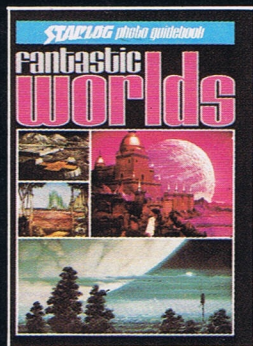
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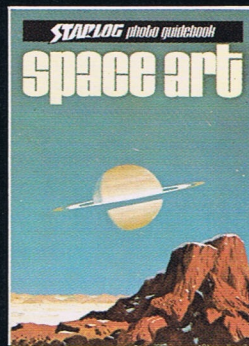
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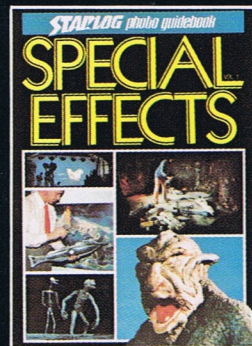
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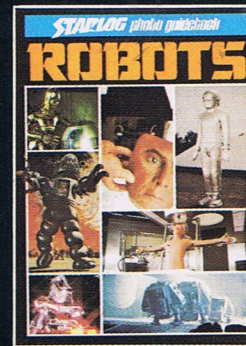
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